Affinity Water

# AFW20 - RORE risk ranges (Economic Insights)

*'This appendix contains the results of analysis carried out by Economic Insight, who we have engaged to assess RoRE risk ranges in PR24. In their analysis Economic Insight have made use of established risk modelling tools, historical data and expert judgement.*

*Three sets of RoRE risk ranges have been calculated and are presented, these are:*

- *An estimation of the 'actual' risk faced by Affinity Water, calculated using its 'actual' capital structure.*
- *An estimation of the 'actual' risk faced by Affinity Water, calculated using the 'notional' capital structure.*
- *An estimation of the risk faced by a 'notionally efficient firm' under the 'notional' capital structure. This analysis can be directly compared with the risk ranges published by Ofwat in its Final Methodology.'*

19th September 2023

Economic Insight

# RoRE RISK AT PR24

PREPARED FOR AFFINITY WATER

# CONTENTS

# MAIN REPORT

# INTRODUCTION AND SCOPE OF WORK

# CONTEXT: CONDUCTING RISK ANALYSIS IS ESSENTIAL TO ENSURING AN APPROPRIATE RISK BALANCE AT PR24. WE HAVE BEEN COMMISSIONED BY AFFINITY WATER TO ASSIST IN CONDUCTING THIS ANALYSIS.

Under Ofwat's PR24 methodology, companies are required to submit RoRE risk ranges for their Plans. Notwithstanding this, undertaking risk analysis is intrinsically valuable for both water companies and Ofwat, for a number of reasons:

**The importance of risk analysis for Ofwat**:

- Risk analysis is crucial to ensure that the proposed design of the price control meets Ofwat's financing duty; which is to "*secure that water companies can (in particular through securing reasonable returns on capital) finance the proper carrying out of their statutory functions*".*
- Specifically, risk analysis is a necessary input for Ofwat to ensure the incentives it sets are calibrated such that they result in a 'balanced package'. By this, we mean the package allows efficient companies, with a notional capital structure, to have a reasonable prospect of achieving a return commensurate with the base allowed equity return.

** Please see: https://www.ofwat.gov.uk/about-us/our-duties/*

**The importance of risk analysis for water companies**:

- For companies, it is crucial to understand the risks that they face over PR24, under Ofwat's method and subsequent determinations. Specifically, it is in companies' interests to understand the '*spread*' of possible financial performance, and '*most likely*' financial performance they can expect over PR24 as a result of Ofwat's policy decisions. This is because:
  - The expected equity return is central to determining whether companies are financeable on an actual and notional basis; and, as such, it is necessary to inform Board assurance regarding the financeability of company Business Plans.
  - Since company Business Plans represent the company's own view of what is achievable if they are 'efficient', risk analysis is necessary to inform whether they deem Ofwat's policy proposals and determinations for PR24 to be acceptable.

With the above in mind, we have been commissioned by Affinity Water to assist in conducting their RoRE risk analysis for PR24. In this pack, we detail our approach to, and results of, this analysis.

# KEY ISSUES: THERE ARE SOME LIMITATIONS WITH OFWAT'S GUIDANCE FOR CONDUCTING RISK ANALYSIS; AND WE HAVE ADVISED AFFINITY TO DEVELOP ROBUST EVIDENCE ON BOTH 'ACTUAL' AND 'NOTIONAL' RISK.

Ofwat has provided guidance to companies regarding '*what*' risk analysis should be conducted, and '*how*' to go about it.

Regarding the '*what*', Ofwat's guidance indicates that:

i. Its own "*focus and that of companies should be different when producing RoRE risk analysis*"; with a view of 'notional' risk produced by Ofwat; and 'actual' company-specific risk produced by the companies themselves.*

Regarding the '*how*', or in other words, the methodology companies should use to calculate their 'actual' company-specific risk, Ofwat further states that:

ii. In populating table RR30, Ofwat's own (notional) % risk ranges should form the starting point of any analysis. Firms can provide their own (actual) risk ranges where they think their risk is different, supported by evidence.

iii. Company-specific risk ranges should be calculated using the notional capital structure (of 55% gearing).

** 'Creating tomorrow, together: consulting on our methodology for PR24. Appendix 10 – Aligning risk and return', Ofwat (July 2022), page 4.*

We consider that there are some limitations with Ofwat's guidance:

- With regards to i., we do not think that 'notional' risk analysis should be left to Ofwat alone. **It is important companies provide their own view of 'notional' risk**, to both: (i) help them understand the acceptability of Ofwat's method and subsequent determinations; while also (ii) providing Ofwat with helpful third-party evidence on a matter critical to determining whether it is fulfilling its financing duty.

- With regards to ii., **this could imply that companies should undertake limited 'actual' risk analysis**, (i.e. simply applying Ofwat's % notional risk ranges to their regulatory equity). However, that would seem to be at odds with Board's being required to provide independent assurance regarding company financeability (i.e. because this requires them to have their own, robust and evidence-based view, on risk).

- With regards to iii., **the use of the 'notional' capital structure in assessing company-specific 'actual' risk could be problematic**. This is because equity risk varies with gearing, so it is inappropriate to 'mix-and-match', as the resultant risk range may lack sensible interpretation. In addition, we have wider concerns that Ofwat's proposed level of notional gearing is inappropriate and, by using it, risk ranges will be understated because they are expressed over an artificially high equity base.

# OUR WORK: WE HAVE DEVELOPED A SET OF THREE DISTINCT RoRE RISK RANGES FOR AFFINITY.

We have undertaken three separate analyses. This is in order to both (i) provide Affinity with a robust assessment of their RoRE risk, using what we consider to be appropriate approaches; whilst also (ii) ensuring that the RR30 tables produced from this analysis are compliant with Ofwat's published guidance.

These three sets of analyses we provide are as follows:

- **An estimation of the 'actual' risk faced by Affinity Water, calculated using its 'actual' capital structure.** We consider this to represent the best estimate of the financial performance risk Affinity faces over PR24.
- **An estimation of the 'actual' risk faced by Affinity Water, calculated using the 'notional' capital structure.** Whilst we have reservations as to the meaningfulness of examining actual risk against a notional gearing of 55%, we have provided this analysis for completeness, as Ofwat's method indicates it wishes RoRE risk ranges to be expressed using notional gearing.
- **An estimation of the risk faced by a 'notionally efficient firm' under the 'notional' capital structure.** This analysis can be directly compared with the risk ranges published by Ofwat in its Final Methodology. We consider this analysis to provide additional evidence as to whether Ofwat's policy proposals for PR24 result in a balanced package of risk for efficient firms. The results can therefore be used by Affinity to inform whether Ofwat's proposals are acceptable (although this should be reexamined subsequently, when Ofwat makes its determinations).

# OUR WORK: WITHIN EACH RoRE RISK RANGE, WE MODEL THE 6 RISK AREAS SPECIFIED BY OFWAT **AS WELL AS THE RISK OF PCDs**. PCDs ARE A NEW (MAINLY DOWNSIDE) OUTCOMES INCENTIVE AT PR24.

While Ofwat expects companies to model the following key areas of risk in their analysis: (i) totex; (ii) retail costs; (iii) revenue incentive mechanisms; (iv) financing (inflation and new debt issuance); (v) ODIs; and (vi) Measures of Experience (MeX), companies are also able to include additional sources of risk in their ranges.

In producing our risk ranges for Affinity Water, we have included an estimation of the risk of Price Control Deliverables (PCDs). PCDs are a new financial incentive at PR24, designed to protect customers from partial or late delivery of enhancement projects.

PCDs, combined with outcome delivery incentives (ODIs) and the cost sharing mechanism, are intended to work to ensure that customers are compensated for *more* than the allowed cost of any under-delivered / late enhancement projects, reflecting foregone benefits.* As a result, companies will be worse off if they fail to deliver the total funded improvement within AMP8, thereby providing a financial incentive for full and timely delivery.

Additional important features of PCDs are as follows:

- **Ofwat expects all companies to propose PCDs** in their Business Plans and has added these proposals to the Quality and Ambition Assessment (QAA).**
- In totality, **Ofwat expects between 60% to 80% of enhancement expenditure across the industry** will be protected by PCDs.***
- **The penalty rate for PCDs is to be set at the average unit cost of delivery**.

As a result of the above, **PCDs are expected to be a material source of (downside) risk for all companies in the industry, that warrant inclusion in the risk ranges**. Further detail regarding the rationale for including PCDs in RoRE risk modelling is included in Annex E.

* '*Creating tomorrow together: Our final methodology for PR24 Appendix 9 – Setting expenditure allowances*.' Ofwat (December 2022); page 75.

** '*Price Control Deliverables Workshop for PR24*.' Ofwat (May 2023); page 5.

*** '*IN 23/05 Further guidance on price control deliverables for PR24*'. Ofwat (May 2023); page 12.

# REPORT STRUCTURE: OUR MAIN REPORT PRESENTS AN OVERVIEW OF OUR APPROACH, KEY RESULTS, AND CONCLUSIONS. FURTHER TECHNICAL DETAIL CAN BE FOUND IN THE ANNEXES.

The remainder of this short report is structured as follows:

- First, we set out, in broad terms, **our approach to conducting 'actual' and 'notional' risk analysis for Affinity Water**. As part of this, we include a high-level description of the methodologies used for each of the risk areas modelled (these are: totex and retail costs; revenue incentive mechanisms; financing costs; ODIs and MeX; and PCDs).
- Having set out our approach, we then detail our **results**. As indicated previously, we present three separate risk ranges: (i) a view of Affinity's 'actual' company-specific risk using their 'actual' projected capital structure for AMP8; (ii) a view of Affinity's 'actual' company-specific risk using the 'notional' capital structure; and (iii) a view of 'notional' risk (i.e. risk faced by a notionally efficient company) using the 'notional' capital structure.
- Finally, we set out our **conclusions and recommendations**.

Appended to this report are technical annexes that include further detail regarding our approach to modelling each of the key risk areas, alongside our calculations. We also include an annex that details our approach to using Monte Carlo models for aggregating our risk ranges (both within certain risk areas and across risk areas). The full list of annexes to this report is as follows:

- Annex A: Totex and retail cost risk
- Annex B: Revenue incentive mechanism risk
- Annex C: Financing cost risk
- Annex D: ODIs and MeX risk
- Annex E: PCD risk
- Annex F: Our use of Monte Carlo models

# KEY DETAILS OF OUR APPROACH

# IN LINE WITH OFWAT'S GUIDANCE, WE DRAW ON HISTORICAL PERFORMANCE TO MAKE INFERENCES REGARDING FUTURE RISK FOR BOTH OUR 'ACTUAL' AND 'NOTIONAL' ANALYSIS.

Our approach to conducting this RoRE risk analysis for Affinity has been carefully developed with Ofwat's guidance in mind. That is to say, our approach draws on historical data to identify the range of out/under-performance companies that have achieved in the past; and uses this to make inferences regarding future risk.

Ofwat's reasoning for its reliance on historical information here is that "*PR24 is an evolution of the past determinations and so historical information remains the most appropriate guide for the overall balance of the framework and is relevant as a reliable source of information reported by companies* [emphasis added]."* While we agree that historical data is of course one relevant source of evidence to consider for the purpose of projecting risk over PR24, it is not always a reliable predictor of the future (this is a 'matter of degree'). Hence, in our view, it should ideally not be the only source that is relied upon.

The key difference between our 'actual' company-specific risk analysis for Affinity and our 'notional' risk analysis relates to which companies we have used to obtain information regarding historical performance:

- For the **'actual' company-specific risk analysis**, we have analysed the past performance of Affinity alone. This is because we consider Affinity's own past performance to be the most likely indicator of its future performance, with the performance of other companies that have different characteristics to Affinity unlikely to be as informative. For this analysis, we have also been able to supplement historical data with Affinity's internal expert judgment, in instances where the historical data is: (i) incomplete; and/or (ii) expected to be a less good predictor of future performance.
- For the **'notional' analysis** (that can be compared directly to Ofwat's published RoRE ranges), we have utilised data in relation to the performance of companies that Ofwat has taken as the efficiency benchmark over prior price controls (i.e. firms Ofwat has deemed to be 'notionally efficient'). We consider this a logical way to obtain a provisional view of notional risk because, had Ofwat successfully balanced notional risk under its previous determinations, we would expect the data/evidence to be consistent with those same firms: (i) having an expected equity return in line with their allowed cost of equity; and (ii) for their risk to be symmetrical (and vice-versa). For this analysis, we do not make use of any expert judgment.

* '*Creating tomorrow together: Our final methodology for PR24 - Appendix 10 Aligning risk and return*', Ofwat (December 2022) page 13.

# WE HAVE INCLUDED FOUR 'EFFICIENT' FIRMS IN OUR ANALYSIS OF NOTIONAL RISK. THESE ARE: (i) NORTHUMBRIAN WATER; (ii) SOUTH STAFFORDSHIRE CAMBRIDGE; (iii) SOUTH WEST WATER AND (iv) SOUTH EAST WATER.

For our notional analysis, the firms we have included in our modelling are: (i) Northumbrian Water; (ii) South Staffordshire Cambridge; (iii) South West Water; and (iv) South East Water. Our reasoning for selecting these firms is as follows:

1. Northumbrian and South West were selected as the efficiency benchmark firms for wholesale water in PR14 and PR19 respectively.
2. Both South Staffordshire Cambridge and South East Water consistently ranked close to the upper quartile cost efficiency level for wholesale water, across both PR14 and PR19.
3. Northumbrian Water was selected as the efficiency benchmark for wastewater in PR19; and ranked close to the upper quartile cost efficiency level for wholesale water in PR19.

To aggregate our results for each of these firms into one risk range representative of the 'notionally efficient firm' we use a weighted average approach, weighting the firms by their wholesale water RCV. This is because we wanted to ensure that our notional risk range was reflective of a 'notionally efficient firm' *like* Affinity, a water-only company.

# METHODOLOGY SUMMARY: QAA; AND TOTEX & RETAIL COST RISK.

In this and the following two slides, we summarise the methodologies we have used to calculate 'actual' company-specific and 'notional' risk ranges for each of the risk areas modelled. Further detail regarding these methodologies can be found in the annexes to this document.

**Quality and ambition assessment risk**

We have included the risk range for the quality and ambition assessment in our results.

For our 'actual' company-specific analysis calculated using notional gearing of 55%; and our 'notional' risk analysis, this is simply -0.30% to +0.30%, in line with Ofwat's methodology.

For our 'actual' company-specific analysis calculated using actual gearing however, we have adjusted the risk range to account for this difference in gearing ratio.

**Totex and retail cost risk**

To model totex and retail cost risk, we undertake a historical analysis of under/over-performance against totex and retail cost allowances for both Affinity (in the case of our 'actual' company-specific analysis); and our four 'efficient' firms (in the case of our 'notional' analysis).

Specifically, we model the historical percentage variation between outturn expenditure and allowances, calculated on a price control basis.

We then use the P10 and P90 historical variance, along with projections of PR24 allowances, to estimate the range of possible performance over PR24, as a percentage of regulatory equity.

# METHODOLOGY SUMMARY: REVENUE INCENTIVE MECHANISM RISK; AND FINANCING COST RISK.

## Revenue incentive mechanism risk

To model the risk imposed by revenue incentive mechanisms at PR24, we collected historical data on allowed and recovered revenues for Affinity and our four 'efficient' firms.

This allowed us to establish the P10 and P90 revenue forecast error observed historically for each firm.

By combining this data with relevant information on the penalty threshold and penalty rate (published by Ofwat for PR24), alongside projections of allowed wholesale revenues at PR24 provided by Affinity, we are able to estimate the range of possible financial penalties that could be received over PR24, and thus construct a risk range.

## Financing cost risk

We calculate both the: (i) inflationary risk on embedded debt; and (ii) cost of new debt risk, as per Ofwat's guidance.**

To calculate inflationary risk, we follow Ofwat's methodology, but flex the inflation assumption (+/-1% variance around a 2% central case). We construct an inflation distribution using the last 10 years of data from the OBR. For Affinity's actual company-specific analysis, we also use Affinity's actual % of index-linked debt in the calculations.

To calculate the cost of new debt risk, we remove Ofwat's 15 bps adjustment to the iBoxx index, as we consider the index itself reflects the likely performance for firms.

* '*A consultation on the Revenue Forecasting Incentive*', Ofwat (July 2023) page 7.
** '*Creating tomorrow, together: Our final methodology for PR24 – Appendix 10: Aligning risk and return*', *Ofwat (2022), page 10-12.*

# METHODOLOGY SUMMARY: ODI & MEX RISK; AND PCD RISK.

## ODI and Mex risk

To model ODI and MeX risk, we gather data on the historical performance of Affinity and our four 'efficient' firms against their targets. For each firm, we calculate the annual variance between outturn performance and the target, before taking the P10 and P90 of this historical variance to inform our risk range.

By applying the P10 and P90 variance to projections of PR24 performance targets, we are able to predict each firm's possible range of performance around its targets at PR24. We then use the PR24 indicative ODI rates published by Ofwat to calculate the implied financial impacts for firms. We also use information published by Ofwat regarding how caps, collars, and enhanced incentives will be used at PR24.*

For ODIs where there is little or no historical data, we supplement this data with the internal expert judgment of Affinity to calculate our 'actual' company-specific risk ranges. For our notional analysis, we have been unable to include ODIs where there is no historical data within our modelling. **This results in our notional risk range being an underestimation of risk for PR24**.

## PCD risk

To calculate PCD risk, we constructed probability distributions of the length of delays for capital and enhancement projects, based on historical evidence of delays to UK construction projects provided by Cornerstone.** Combining these delay length distributions with Affinity's PCD proposals*** enabled us to obtain a range of possible financial impacts of PCDs over PR24 (in the form of PCD penalty payments and time delivery incentive payments), and thus construct our risk ranges:

- For our 'actual' company-specific ranges, we simply flexed whether we used projected actual or notional gearing in our calculations.
- For our 'notional' risk range, we used the 'actual' company-specific range obtained for Affinity when using the notional gearing ratio of 55% (as we do not have access to other company proposals). However, we scale this risk range according to the difference between: (i) the proportion of enhancement costs included in Affinity's PCD proposals; and (ii) the mid-point of Ofwat's expectations regarding the enhancement to be included in company PCD proposals.

* '*Creating tomorrow together: Our final methodology for PR24 - Appendix 8 Outcome delivery incentives*', Ofwat (December 2022).

** '*Delays in the Construction Industry: 2022 Survey*'. *Cornerstone (January 2023).*

*** *PCD proposals received from Affinity on 13-09-23 at 14:04.*

# WE USE MONTE CARLO MODELS TO: (i) AGGREGATE THE RISKS OF INDIVIDUAL ODIs AND PCDs; AND (ii) AGGREGATE ACROSS ALL RISK AREAS TO OBTAIN AN OVERALL RISK RANGE FOR THE COMPANY.

Across our three sets of analyses, we use a series of Monte Carlo models to aggregate our results. This is for two key reasons:

1. First, this method reflects the fact that companies are highly unlikely to experience the extreme ends of all risks simultaneously. A Monte Carlo simulation therefore builds in a more realistic range of possibilities.
2. Secondly, the output of a Monte Carlo simulation is not simply a range of two numbers, but a distribution of possible values of an aggregated outcome. Therefore, this allows us to gather more information and useful statistics about the range of possible outcomes, including the 'most likely' outcome, than we could gain from a simple aggregation approach.

Ofwat's methodology does not make use of Monte Carlo models, and instead simply aggregates the results. Ofwat's reasoning for this is that it is *"not convinced that the additional complexity associated with the use of such approaches would necessarily improve RoRE risk ranges derived by other means"*,* owing to Monte Carlo models being sensitive to the quality of inputs. We consider that our use of historical data, combined with expert judgment and projections, results in sufficiently high-quality input data to allow Monte Carlo models to be used effectively; and that therefore, the benefits of doing so outweigh the complexities.

In our work, we have used Monte Carlo models in the following ways:

- To aggregate the risks of individual **ODIs and MeX** to produce one risk range for this risk area;
- To aggregate the risks of individual **PCDs**, to produce one risk range for this risk area; and
- To aggregate the risks across **all risk areas**, to produce an overall risk range for the company.

Further details regarding our use of Monte Carlo models can be found in Annex F.

* '*Creating tomorrow together: consulting on our methodology for PR24 - Appendix 10 Aligning risk and return*', Ofwat (July 2022), page 6.

# RESULTS

# OUR **ACTUAL COMPANY-SPECIFIC** RISK ANALYSIS SHOWS THAT AFFINITY FACES A RISK RANGE THAT IS MATERIALLY SKEWED TO THE DOWNSIDE OVER PR24; OWING PREDOMINANTLY TO THE DESIGN OF ODIs AND PCDs.

In the table below, we present the results of our 'actual' RoRE risk analysis for Affinity. This has been calculated in two ways: (i) 'actual' performance risk under the 'notional' capital structure (as required under Ofwat's guidance); and (ii) 'actual' performance risk under the 'actual' capital structure (which we consider more meaningful). We include the former to ensure the approach indicated by Ofwat is reported for the purposes of RR30 table completion. However, viewing 'actual risk' over a 'hypothetical' (and smaller) equity base than Affinity actually has, has less intuitive meaning.

**Table: 'Actual' RoRE risk range summary**

| Risk area | EI actual risk analysis consistent with Ofwat guidance (actual risk under notional capital structure) | | EI actual risk analysis (actual risk under actual capital structure) | |
|---|---|---|---|---|
| | Reasonable downside (P10) | Reasonable upside (P90) | Reasonable downside (P10) | Reasonable upside (P90) |
| Quality and ambition assessment | -0.30% | 0.30% | -0.65% | 0.65% |
| Totex | -0.50% | 0.49% | -1.08% | 1.05% |
| Retail costs | -0.43% | -0.27% | -0.94% | -0.58% |
| Revenue incentive mechanisms | -0.03% | 0.00% | -0.06% | 0.00% |
| Financing | -0.28% | 0.46% | -0.87% | 1.44% |
| ODIs and MeX | -3.11% | 0.85% | -6.75% | 1.84% |
| PCDs | -1.68% | -0.54% | -3.66% | -1.19% |
| **Total (simple aggregation)** | **-6.33%** | **1.29%** | **-14.01%** | **3.21%** |
| **Total (Monte Carlo aggregation)** | **-5.35%** | **0.31%** | **-11.76%** | **0.79%** |

*Source: Economic Insight analysis*

As shown, the risk range we have calculated for Affinity is significantly skewed to the downside; regardless of the capital structure used in the calculations.

PCDs and ODIs heavily contribute to downside risk.

As expected, the risk range narrows when using the Monte Carlo aggregation approach, as this approach reflects the idea that it is unlikely that the more 'extreme' scenarios will be realised across all building block areas simultaneously.

# OUR **NOTIONAL** ANALYSIS SHOWS THAT (ABSTRACTING FROM AFFINITY'S OWN PERFORMANCE AND CHARACTERISTICS) THE PR24 INCENTIVE PACKAGE PROPOSED BY OFWAT RESULTS IN MATERIAL DOWNSIDE RISK FOR 'NOTIONALLY EFFICIENT' FIRMS.

In the table below, we present the results of our 'notional' RoRE risk analysis. This is calculated as the weighted average RoRE risk range for Northumbrian Water, South East Water, South West Water, and South Staffordshire Cambridge, across each of the risk areas modelled. We compare these results to the view Ofwat put forward in its Final Methodology.

**Table: 'Notional' RoRE risk range summary**

| Risk area | Ofwat FM results (notional risk under notional capital structure) | | EI notional risk analysis (notional risk under notional capital structure) | |
|---|---|---|---|---|
| | Reasonable downside (P10) | Reasonable upside (P90) | Reasonable downside (P10) | Reasonable upside (P90) |
| Quality and ambition assessment | -0.30% | 0.30% | -0.30% | 0.30% |
| Totex | -1.00% | 1.00% | -2.57% | 1.22% |
| Retail costs | -0.20% | 0.30% | -0.29% | 0.11% |
| Revenue incentive mechanisms | -0.05% | 0.00% | -0.05% | 0.00% |
| Financing | -0.65% | 0.70% | -1.09% | 1.92% |
| ODIs and MeX | -2.65% | 2.50% | -1.80% | -0.81% |
| PCDs | N/A | N/A | -1.56% | -0.51% |
| **Total (simple aggregation)** | **-4.85%** | **4.80%** | **-7.65%** | **2.21%** |
| **Total (Monte Carlo aggregation)** | | | **-6.54%** | **1.05%** |

*Source: Economic Insight analysis; and 'Creating tomorrow, together: Our final methodology for PR24 – Appendix 10: Aligning risk and return', Ofwat (2022), page 10-12.*

As shown, the risk range we have calculated for the 'notionally efficient firm' is also strongly skewed to the downside; and is wider than Ofwat's view.

# CONCLUSIONS AND RECOMMENDATIONS

# CONCLUSIONS: OUR ANALYSIS IMPLIES THAT OFWAT'S CURRENT PROPOSALS FOR PR24 DO NOT ALLOW COMPANIES TO SECURE REASONABLE EQUITY RETURNS OVER THE UPCOMING PRICE CONTROL PERIOD.

**Based on Affinity's company-specific risk ranges**, we can see that Affinity faces risk that is materially skewed to the downside over PR24.

This implies that to be considered financeable, if nothing changes, the cost of equity would have to be increased in order to compensate for this materially higher downside risk. That is to say, one would need to 'aim up' on the cost of equity, in addition to any 'aiming up' to account for measurement uncertainty in the WACC.

**Based on our view of notional risk**, this shows that (abstracting from Affinity's historical performance and company-specific characteristics), even firms that are considered 'efficient' by Ofwat have expected returns over PR24 that are heavily skewed to be below the cost of equity.

Taken in the round, our risk ranges show that the main drivers of the downside skew for PR24 are both ODIs and MeX, and PCDs:

- **Regarding ODIs**, the combination of: (i) historically stretching targets (with this level of stretch expected to continue); along with (ii) the new PR24 rates published by Ofwat that are significantly larger than at PR19, are the key components driving the downside skew across the risk ranges.
- **Regarding PCDs**, as these are a mainly downside incentive, it is to be expected that they add a downside skew to the risk range. The extent of the skew relates to the fact that the incentive is expected to cover a significant proportion of industry enhancement spend (approximately 60-80%), and is exacerbated by: (i) the double count risk of penalties being incurred on both ODIs and PCDs simultaneously; and (ii) the penalty rates being based on the average unit cost, rather than the marginal cost of delivery. Further detail surrounding these issues is included in Annex E.

# RECOMMENDATIONS: WE RECOMMEND THAT AFFINITY ENGAGES WITH OFWAT TO BALANCE THE INCENTIVE PACKAGE FOR PR24; AND MITIGATES THE RISKS ARISING WITHIN THEIR BUSINESS PLAN, AS FAR AS IS POSSIBLE.

As a result of this work, we have two key recommendations for Affinity. These are:

1. First, **we recommend that Affinity engage with Ofwat to balance the incentive package for PR24,** highlighting the downside risk that is currently embedded into the proposals, and providing the regulator with the information required to be able to effectively calibrate the incentives, such that it is possible to gain a better 'balance'. We agree with Ofwat's preference to correct issues of asymmetry at source,* and would recommend that this work is therefore focused on recalibrating the risk that results from the design of both ODIs and PCDs in the first instance. We would be happy to provide support and advice on this matter to both Affinity, and to Ofwat.

2. Second, **we recommend that Affinity mitigates the risks arising as a result of Ofwat proposals as far as is possible within their Business Plan**. We acknowledge that, by definition, the Plan being proposed to Ofwat will likely reflect Affinity's best view of what can be delivered on an efficient basis, and therefore, mitigating actions are likely embedded into the plan. Certain areas where further action could be taken include reducing the extent of PCD proposals, as further detailed in Annex E.

* '*Creating tomorrow together: Our final methodology for PR24 Appendix 10 – Aligning risk and return*.' Ofwat (December 2022); page 5.

# ANNEX A: TOTEX AND RETAIL COST RISK

# BROAD APPROACH: WE USE HISTORICAL DATA TO ESTIMATE THE RANGE OF LIKELY PERFORMANCE AGAINST TOTEX AND RETAIL COST ALLOWANCES OVER PR24.

For our totex and retail cost RoRE risk analysis, we made use of historical data to estimate the likely range of possible over- or under-spend over PR24 for Affinity (in the case of our 'actual' risk analysis) and the four 'notionally efficient' firms (in the case of our 'notional' risk analysis). This is consistent with guidance from Ofwat.* We also ensured to conduct our analysis on a price control basis, rather than on an annualised basis, in line with the guidance. Specifically, we:

- Used historical data on cost allowances and outturn performance for both totex and retail costs to **calculate the percentage variation in performance from the allowances on a price control basis**.
- **Applied the P10 and P90 variation from allowances for each firm to projections of totex and retail cost allowances for PR24 for each firm**. We were provided with projections from Affinity regarding their own performance, and constructed our own projections for the four 'notionally efficient' firms.
- **Converted these results to be expressed as a % RoRE** using regulatory equity and gearing projections, in order to obtain risk ranges for each firm. Once again, projections for Affinity were provided to us by their internal experts, while projections for the remaining four companies were generated by us.

For our 'notional' analysis, we made a further adjustment to the results to account for a higher efficiency challenge than the upper quartile level (assuming that Ofwat takes an approach similar to the one it took in its PR19 determinations).** The intuition behind this adjustment is that there is no reason to believe that the 85$^{th}$ percentile is a better reflection of the 'efficient' cost level than the upper quartile level. To make this adjustment, we used the PR24 cost models to estimate the average change to the cost allowances for each firm if the efficiency target was increased to the 85$^{th}$ percentile.

In the following slides, we detail the key results for both our 'actual' and 'notional' risk analysis, before setting out additional detail regarding the data inputs and assumptions used to obtain these results.

* '*Creating tomorrow together: Our final methodology for PR24 Appendix 10 – Aligning risk and return*.' Ofwat (December 2022); page 13.

** At PR19, Ofwat stated its intention to go further than the upper quartile efficiency level of PR14, setting the efficiency benchmark at the 85th percentile. However, the CMA rejected this shift to the 85$^{th}$ percentile, keeping the efficiency challenge at the UQ. Please see Technical appendix 2: Securing cost efficiency, Ofwat (2019); page 4 and '*Anglian Water Services limited, Bristol Water plc, Northumbrian Water limited, and Yorkshire Water Services limited, price determinations final report*', CMA (March 2021); page 232.

# ‘ACTUAL’ COMPANY-SPECIFIC RESULTS: USING HISTORICAL ANALYSIS RESULTS IN A RELATIVELY NARROW AND BROADLY SYMMETRICAL RISK RANGE FOR AFFINITY ON TOTEX; AND A MATERIAL DOWNSIDE SKEW ON RETAIL COSTS.

In the table to the right, we present the totex and retail cost risk ranges for our ‘actual’ company-specific risk analysis.

With regards to our totex analysis, we see a very slight downside skew, reflecting Affinity’s slightly higher propensity to over- than under-spend in the past. Overall, the risk range is relatively narrow, owing to Affinity performing within a more limited under- and over-spend range compared to the industry as a whole.

With regards to our retail cost analysis, we can see a strong downside skew. This is a result of an overall overspend by Affinity on retail costs over both PR14, and the first two years of PR19 taken together.

As is to be expected, using Affinity’s actual gearing ratio expands the RoRE risk ranges for both totex and retail costs, owing to Affinity being more highly geared than the ‘notional’ firm.

**Table: ‘Actual’ totex and retail cost risk ranges**

| | EI actual risk analysis consistent with Ofwat guidance (actual risk under notional capital structure) | | EI actual risk analysis (actual risk under actual capital structure) | |
|---|---|---|---|---|
| | P10 | P90 | P10 | P90 |
| Totex RoRE risk | -0.50% | 0.49% | -1.08% | 1.05% |
| Retail cost RoRE risk | -0.43% | -0.27% | -0.94% | -0.58% |

*Sources: Economic Insight analysis of Ofgem’s RIIO-ED2 DD Technical Annex 1 - AR ER database; and Ofwat’s 2019-20 SDR and 2021-22 WCPR.*
*Note: Positive performance relates to underspend against allowances.*
*It should be noted that, to measure variation across price control periods, we have used PR14 data, and the first two years of PR19 (so this is not reflective of a ‘whole’ price control).*

# ‘NOTIONAL’ RESULTS: OUR TOTEX ANALYSIS RESULTS IN A WIDER RANGE COMPARED TO OFWAT AND OUR RETAIL COST RANGES ARE BROADLY OF SIMILAR MAGNITUDE.

The table below presents our ‘notional’ risk analysis for totex and retail costs compared to the view provided by Ofwat in its Final Methodology. We present our disaggregated results for each ‘notionally efficient’ firm; as well as our aggregated results (where we weight each individual firm by the size of their wholesale water RCV).

As shown, for both totex and retail costs, we obtain an overall ‘notional’ range that is skewed towards the downside.

**Table: ‘Notional’ totex and retail cost risk ranges**

| | Ofwat FM results (notional risk under notional capital structure) | | EI notional risk analysis (notional risk under notional capital structure) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Aggregated ‘notionally efficient’ firm | | Disaggregated analysis | | | | | | | |
| | | | | | NES | | SEW | | SSC | | SWB | |
| | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 |
| Totex RoRE risk | -1.00% | 1.00% | -2.57% | 1.22% | -2.93% | 1.22% | -2.63% | 0.44% | -2.46% | 2.04% | -2.04% | 1.69% |
| Retail RoRE risk | -0.20% | 0.30% | -0.29% | 0.11% | -0.43% | 0.04% | -0.25% | 0.20% | -0.81% | 0.25% | 0.02% | 0.07% |

*Source: Economic Insight analysis of Ofgem’s RIIO-ED2 DD Technical Annex 1 - AR ER database; Ofwat’s 2019-20 SDR and 2021-22 WCPR*
*Note: Positive performance relates to underspend against allowances.*

# DATA INPUTS AND ASSUMPTIONS: DATA REGARDING THE HISTORICAL PERFORMANCE OF FIRMS AGAINST THEIR TOTEX AND RETAIL ALLOWANCES HAS BEEN OBTAINED FROM MULTIPLE SOURCES.

The historical input data regarding totex and retail cost allowances and outturn performance has been obtained from the following sources:

- Ofgem's RIIO-ED2 DD Technical Annex 1 - AR ER database;
- Ofwat's 2019-20 Service Delivery Report; and
- Ofwat's 2021-22 Water Company Performance Report (WCPR)

The use of these sources allowed us to include data from 2000/01 for the purposes of our totex risk analysis; and from 2015/16 for the retail cost risk analysis. As a result, our retail cost risk analysis covers 1 full price control period (PR14); and the first 2 years of PR19.

In the table to the right, we present the P10 and P90 of the % variation in outturn performance from totex and retail cost allowances, for each firm used in our analysis. These figures were then used in combination with allowance projections for PR24 to generate a RoRE risk range.

As shown, historically Affinity has performed closer to its totex allowances than the four 'notionally efficient' firms included in our analysis. Performance against retail cost allowances has been more mixed.

**Table: Historical % variation from totex and retail cost allowances**

| | Variation from totex allowance (price control basis) | | Variation from retail cost allowance (price control basis) | |
|---|---|---|---|---|
| | P10 | P90 | P10 | P90 |
| Affinity | -1.69% | -1.67% | -13.51% | -8.29% |
| Northumbrian | -9.03% | 3.77% | -19.78% | 2.05% |
| South East | -9.28% | 1.55% | -14.80% | 11.95% |
| South Staffordshire Cambridge | -6.00% | 4.99% | -20.34% | 6.16% |
| South West | -8.45% | 7.00% | 1.13% | 5.31% |

*Sources: Economic Insight analysis of Ofgem's RIIO-ED2 DD Technical Annex 1 - AR ER database; and Ofwat's 2019-20 SDR and 2021-22 WCPR.*
*Note: Positive performance relates to underspend against allowances.*
*It should be noted that, to measure variation across price control periods, we have used PR14 data, and the first two years of PR19 (so this is not reflective of a 'whole' price control).*

# DATA INPUTS AND ASSUMPTIONS: AFFINITY HAS PROVIDED US WITH ITS OWN PROJECTIONS FOR COST ALLOWANCES; RCV AND GEARING. FOR THE 'NOTIONAL' FIRMS, WE HAVE GENERATED OUR OWN PROJECTIONS.

The table below summarises the additional input data used to derive our risk ranges.

**Table: Key input data to calculate totex and retail cost risk ranges**

| | Affinity expert judgment | EI generated projections | | | |
|---|---|---|---|---|---|
| | Affinity | Northumbrian | South East | South Staffordshire | South West |
| Estimated PR24 totex allowance | £1452m | £3,493m | £1,108m | £491m | £2,027m |
| Estimated PR24 retail cost allowance | £157m | £233m | £67m | £48m | £113m |
| Estimated PR24 annual average RCV | £2,185m | £4,788m | £1,740m | £533m | £3,735m |
| Estimated PR24 actual gearing ratio | 79.3% | N/A | N/A | N/A | N/A |

*Source: Affinity projections and Economic Insight analysis*

For the purposes of our 'actual' company-specific analysis for Affinity, we relied on Affinity's expert judgment regarding the PR24 totex and retail cost allowances; as well as for the RCV and 'actual' gearing ratio.

For the purposes of our 'notional' analysis, we generated projections of allowances and RCV for each firm based on historical average annual growth rates.

For all analysis where the 'notional' capital structure was used, we used a gearing ratio of 55%, in line with Ofwat's Final Methodology.

# ANNEX B: REVENUE INCENTIVE MECHANISM RISK

# BROAD APPROACH: WE ALSO RELY ON HISTORICAL DATA TO ESTIMATE THE RANGE OF LIKELY PERFORMANCE WITH REGARDS TO THE REVENUE INCENTIVE MECHANISM OVER PR24.

Similarly to our totex and retail cost RoRE risk analysis, we made use of historical data to estimate the likely range of possible performance with regards to the revenue incentive mechanism, for both Affinity (in the case of our 'actual' risk analysis) and the four 'notionally efficient' firms (in the case of our 'notional' risk analysis). We conducted this analysis on an annual basis, rather than on a price control basis, due to penalties being incurred annually. Specifically, we:

- Collect data on allowed and recovered revenues from 2015/16 onwards, for Affinity and our four 'notional' firms, in order to **calculate the percentage revenue forecast error for each firm, in each year**.
- **Applied the P10 and P90 revenue forecast error to projections of revenue allowances for PR24 for each firm**. We were provided with projections from Affinity regarding their own performance, and constructed our own projections for the four 'notionally efficient' firms.
- Used information published by Ofwat regarding how the revenue incentive mechanism will function over PR24, in order to **calculate the range of possible financial implications for each firm, based on their likely revenue forecast errors**. Specifically, at PR24, Ofwat intend to use the revenue incentive mechanism in a similar way to PR19, by:
  - applying a penalty where actual revenues differ from allowed revenues by ±2%; and
  - using a penalty rate of 3% (that applies to the actual revenue that falls outside of the ±2% threshold).*
- **Converted these results to be expressed as a % RoRE** using regulatory equity and gearing projections, in order to obtain risk ranges for each firm. Once again, projections for Affinity were provided to us by their internal experts, while projections for the remaining four companies were generated by us.

In the following slides, we detail the key results for both our 'actual' and 'notional' risk analysis, before setting out additional detail regarding the data inputs and assumptions used to obtain these results.

* *'A Consultation on the Revenue Forecasting Incentive'. Ofwat, (July 2023), page 7.*

# RESULTS: THE RISK RANGES FOR REVENUE INCENTIVE MECHANISMS ARE WELL ALIGNED WITH THE VIEW PRESENTED BY OFWAT IN ITS FINAL METHODOLOGY.

In the table to the right, we present the revenue incentive mechanism risk ranges for our 'actual' company-specific risk analysis. Below, we present the risk range for our 'notional' analysis compared to the view provided by Ofwat in its Final Methodology. We present our disaggregated results for each 'notionally efficient' firm; as well as our aggregated results (where we weight each individual firm by the size of their wholesale water RCV).

As shown, the risk ranges we present for the 'notionally efficient' firm are in line with the view presented by Ofwat in its Final Methodology. For Affinity, the risk range is slightly wider and more skewed to the downside when using actual projected gearing.

**Table: 'Actual' revenue incentive mechanism risk ranges**

| | EI actual risk analysis consistent with Ofwat guidance (actual risk under notional capital structure) | | EI actual risk analysis (actual risk under actual capital structure) | |
|---|---|---|---|---|
| | P10 | P90 | P10 | P90 |
| Revenue incentive mechanism risk | -0.03% | 0.00% | -0.06% | 0.00% |

*Sources: Economic Insight analysis.*

**Table: 'Notional' revenue incentive mechanism risk ranges**

| | Ofwat FM results (notional risk under notional capital structure) | | EI notional risk analysis (notional risk under notional capital structure) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Aggregated 'notionally efficient' firm | | Disaggregated analysis | | | | | | | |
| | | | | | NES | | SEW | | SSC | | SWB | |
| | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 |
| Revenue incentive mechanism risk | -0.05% | 0.00% | -0.05% | 0.00% | -0.02% | 0.00% | -0.05% | 0.00% | -0.08% | 0.00% | -0.07% | 0.00% |

*Source: Economic Insight and Ofwat analysis.*

# DATA INPUTS AND ASSUMPTIONS: DATA REGARDING THE HISTORICAL PERFORMANCE OF FIRMS AGAINST THEIR TOTEX AND RETAIL ALLOWANCES HAS BEEN OBTAINED FROM MULTIPLE SOURCES.

The historical input data regarding company revenue forecast errors has been obtained from the industry APRs, and the PR19 blind year reconciliations. In the table to the right, we present the P10 and P90 of the % forecast error for each firm used in our analysis.

These figures were then used in combination with allowance projections; Ofwat's specification of the revenue incentive mechanism at PR24; and CPI projections, to generate a RoRE risk range.

Revenue projections are included in the table below. Affinity's projections were provided to us by Affinity; and the projections for the 'notional' firms were generated by us, by using annual average historical growth rates. The RCV and gearing used is consistent with that used for the totex and retail cost calculations, as detailed here. We use the annual CPI projections put forward by Ofwat in table 3.2 of its Final Methodology, Appendix 11 – Allowed Return (page 21).

**Table: Historical revenue forecast error**

| | Revenue forecast error | |
|---|---|---|
| | P10 | P90 |
| Affinity | 2.5% | 0.2% |
| Northumbrian | 1.7% | 0.4% |
| South East | 3.5% | 0.7% |
| South Staffordshire Cambridge | 3.7% | 1.2% |
| South West | 5.8% | 1.8% |

*Sources: Analysis of industry APRs and PR19 blind year reconciliations*

**Table: Revenue allowance projections used to calculate a RoRE risk range for the revenue incentive mechanism**

| | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/30 |
|---|---|---|---|---|---|
| Affinity | £433m | £422m | £418m | £420m | £418m |
| Northumbrian | £791m | £790m | £788m | £787m | £785m |
| South East | £279m | £278m | £278m | £278m | £277m |
| South Staffordshire | £137m | £134m | £131m | £128m | £125m |
| South West | £584m | £579m | £575m | £571m | £567m |

*Source: Affinity projections and Economic Insight analysis.*

# ANNEX C: FINANCING COST RISK

# BROAD APPROACH: WE MODEL BOTH THE INFLATIONARY IMPACT ON EMBEDDED DEBT RISK AND THE COST OF NEW DEBT RISK IN LINE WITH OFWAT'S METHODOLOGY.

In line with Ofwat's methodology for undertaking a risk analysis of financing costs;* we model risks relating to both: (i) the cost of embedded debt; and (ii) the cost of new debt.

With regards to (i), **we model the inflationary impact on embedded debt risk similarly to Ofwat**. However, we flex:

- Ofwat's inflation assumptions, generating our own inflation assumptions based on the latest OBR inflation forecasts for both our 'actual' company-specific, and 'notional' risk ranges.
- Ofwat's assumption regarding the proportion of index-linked debt to be based on the latest APR data for each firm included in our analysis.

With regards to (ii), **we model the cost of new debt risk using information regarding how Ofwat has set the cost of new debt allowance**.

- Specifically, Ofwat has set the allowance based on an average of two indices: the iBoxx 10+ A-; and BBB (as published by IHS Markit).** Ofwat then proposes to apply a 15-basis points discount off the average derived from its benchmark above. This is because the regulator considers the evidence is consistent with companies being able to issue new debt below the rates implied by said benchmark.
- We consider that the iBoxx indices as stated represent the most likely reflection of the rates at which water companies will be able to issue new debt. Therefore, to generate our risk range, we have simply accounted for this being a 'more stretching' allowance, by adjusting expected performance levels downwards by 15-basis points.

In the following slides, we detail the key results for both our 'actual' and 'notional' risk analysis, before setting out additional detail regarding the calculations used to obtain these results.

*'*Creating tomorrow together: Our final methodology for PR24 Appendix 10 – Aligning risk and return*.' Ofwat (December 2022).
**'*Creating tomorrow together: Our final methodology for PR24 Appendix 11 – Allowed return on capital*.' Ofwat (December 2022).

# RESULTS: OUR RANGES FOR FINANCING COSTS ARE WIDER THAN OFWAT'S VIEW, AND SKEWED TOWARDS THE UPSIDE. THIS PRIMARILY REFLECTS THAT WE EXPECT INFLATION TO TREND HIGHER THAN OFWAT'S VIEW OVER THE NEXT AMP.

In the table to the right, we present the financing cost risk ranges for our 'actual' company-specific risk analysis. Below, we present the risk range for our 'notional' analysis compared to the view provided by Ofwat in its Final Methodology. We present our disaggregated results for each 'notionally efficient' firm; as well as our aggregated results (where we weight each individual firm by the size of their wholesale water RCV).

As shown, our risk ranges are wider and more positively skewed than the view put forward by Ofwat in its Final Methodology. This is predominantly a result of the risk range relating to the inflationary impact on embedded debt – as our expectations regarding inflation over the next AMP are higher than put forward by Ofwat.

**Table: 'Actual' financing cost risk ranges**

| | EI actual risk analysis consistent with Ofwat guidance (actual risk under notional capital structure) | | EI actual risk analysis (actual risk under actual capital structure) | |
|---|---|---|---|---|
| | P10 | P90 | P10 | P90 |
| Financing cost risk | -0.28% | 0.46% | -0.87% | 1.44% |

*Sources: Economic Insight analysis.*

**Table: 'Notional' financing cost risk ranges**

| | Ofwat FM results (notional risk under notional capital structure) | | EI notional risk analysis (notional risk under notional capital structure) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Aggregated 'notionally efficient' firm | | Disaggregated analysis | | | | | | | |
| | | | | | NES | | SEW | | SSC | | SWB | |
| | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 | P10 | P90 |
| Financing cost risk | -0.65% | 0.70% | -1.09% | 1.92% | -1.02% | 1.78% | -0.74% | 1.29% | -1.31% | 2.31% | -1.45% | 2.57% |

*Source: Economic Insight and Ofwat analysis.*

# DETAILED CALCULATIONS: INFLATIONARY RISK ON EMBEDDED DEBT.

In the table below, we present the assumptions and calculations used by Ofwat to arrive at the risk range presented in its Final Methodology, alongside our own. As shown, our methodology for calculating risk ranges remains the same as Ofwat's, however we flex:

- **The inflation assumption used**. Specifically, rather than using +/-1% variation around the 2% central case in line with Ofwat, we update our inflation expectations for PR24 to be based on the last 10 years of data collected by the OBR.
- **The % of non-index-linked debt used**. Specifically, rather than assuming that the % of non-index-linked debt is 67% in line with Ofwat, we instead use data extracted from the latest APR for each firm included in our analysis (that is, Affinity for our 'actual' company-specific analysis; and our four 'notionally efficient' firms for our 'notional' analysis). The data used for each firm is shown in the second green table.

Similarly to the rest of our analysis, we use Affinity's own actual gearing projections to calculate our 'actual' company-specific risk range that uses the 'actual' capital structure.

**Table: Inflationary risk on embedded debt calculations**

| | Ofwat view | | | EI view – 'actual' company-specific risk ranges | | |
|---|---|---|---|---|---|---|
| **Component** | Calculation | P10 | P90 | Calculation | P10 | P90 |
| **Inflation** | *+/-1% variation around 2% central case* | -1% | +1% | *2012-2022 (last 10 years - more recent outturn data) variation around 2% central case* | -1.68% | 3.04% |
| **% non-index-linked debt** | *1-33%* | 67% | 67% | Company specific percentage extracted from 'APR 2023 - 4B' | 14% (AFW) | 14% (AFW) |
| **Notional gearing** | *55%/(1-55%)* | 1.22 | 1.22 | *55%/(1-55%)* | 1.22 | 1.22 |
| **PR24 projected gearing** | *N/A* | - | - | *79%/(1-79%)* | *3.83* | *3.83* |
| **Tax rate** | *1-25%* | 75% | 75% | *1-25%* | 75% | 75% |
| **Risk range (notional)** | ***Multiplication of above components, rounded*** | **-0.60%** | **+0.60%** | ***Multiplication of above components, rounded*** | **-0.21%** | **0.39%** |
| **Risk range (actual)** | | **-** | **-** | | **-0.67%** | **1.22%** |

| | Northumbrian | South East | South Staffordshire | South West |
|---|---|---|---|---|
| **% Non-indexed-linked debt** | 62% | 44% | 81% | 91% |

# DETAILED CALCULATIONS: COST OF NEW DEBT RISK (1).

Ofwat sets the allowed cost of new debt based on an average of two indices: the iBoxx 10+ A; and BBB (as published by IHS Markit). For the purpose of publishing its early view, Ofwat has applied a 1-month trailing average period. Ofwat proposes to then apply a 15-basis points discount off the average derived from its benchmark. Adjusting for inflation, this gives a cost of new debt allowance of 3.28%, as shown in the table to the top right.

To estimate the cost of new debt risk, Ofwat analyses a sample of 60 fixed rate issuances, which it states gives a P10 to P90 range of **0.3% and -0.7% compared with the allowed return on new debt of 3.28%** (i.e., the P90 performance level would be the allowed return on new debt of 3.28% less 0.7%; and the P10 performance level would be the allowed return of 3.28% plus 0.3%). Ofwat states that when converted into a RoRE range (using the notional gearing ratio of 55%; assumed share of new debt of 17%; and assumed share of fixed debt of 67%), the above equates to **-0.05% and 0.10%.** These calculations are summarised in the table to the bottom right.

**Table: Ofwat's calculations for the allowed cost of new debt**

| Component | Industry value proposed by Ofwat |
|---|---|
| iBoxx A-/BBB 10+ yield (nominal, 1 month trailing ) average to 30/09/2022 | 5.49% |
| Discount of benchmark | -0.15% |
| Allowed cost of new debt (nominal) | 5.34% |
| Allowed cost of new debt (real, CPIH) | 3.28% |

**Table: Ofwat's calculations for the allowed cost of new debt risk range**

| | Ofwat view | | |
|---|---|---|---|
| Component | Calculation | P10 | P90 |
| Inferred performance level | *0.30% to -0.70%* | 0.30% | -0.70% |
| Notional gearing | *55%/(1-55%)* | 1.22 | 1.22 |
| Share of new debt | *17%* | 17% | 17% |
| Share of fixed debt | *67%* | 67% | 67% |
| Risk range (notional gearing) | ***Multiplication of above components, rounded*** | **-0.05%** | **+0.10%** |

Sources: '*Creating tomorrow together: Our final methodology for PR24 Appendix 10 – Aligning risk and return*.' Ofwat (December 2022); and '*Creating tomorrow together: Our final methodology for PR24 Appendix 11 – Allowed return on capital*.' Ofwat (December 2022).

# DETAILED CALCULATIONS: COST OF NEW DEBT RISK (2).

Ofwat justifies its 15 bps adjustment on the cost of new debt allowance by stating that there is evidence that is consistent with companies being able to issue new debt below the rates implied by the iBoxx indices.

However, we consider that the iBoxx indices as stated represent the most likely indication of the rates at which water companies will be able to issue new debt. Given this, performance against Ofwat's cost of new debt over PR24 will likely be lower as a result of the adjustment made.

Therefore, to generate our risk range, we have simply accounted for this being a 'more stretching' allowance. Our calculations are summarised in the table to the right. Specifically, we adjust the 'inferred' P10 and P90 performance levels downwards, and recalculate the risk ranges using the parameters specified by Ofwat. The only exception to this is for the calculation of Affinity's 'actual' company-specific risk using actual projected gearing, where we use a gearing ratio of 79% rather than Ofwat's view of notional gearing (55%).

**Table: EI calculations for the cost of new debt risk range**

| | Ofwat view | | |
|---|---|---|---|
| **Component** | Calculation | P10 | P90 |
| **Ofwat's inferred performance level** | *0.30% plus 15bps; -0.70 less 15bps* | 0.45% | 0.55% |
| **Notional gearing** | *55%/(1-55%)* | 1.22 | 1.22 |
| **AFW actual gearing** | *79%/(1-79%)* | *3.83* | *3.83* |
| **Share of new debt** | *50%* | *50%* | *50%* |
| **Share of fixed debt** | *16%* | *16%* | *16%* |
| **Risk range (notional gearing)** | ***Multiplication of above components, rounded*** | **-0.06%** | **+0.08%** |
| **Risk range (actual gearing)** | | **-0.20%** | **+0.24%** |

# ANNEX D: ODI AND MEX RISK

# INTRODUCTION AND STRUCTURE OF THIS ANNEX.

This annex provides further information about the data used and calculations performed to reach our set of three RoRE risk ranges for ODIs.

The structure of this annex is as follows:

- **Details of approach and PC-by-PC results:** This provides an overview of our methodology for calculating ODI and MeX risk and reports the results of our 'actual' company-specific analysis and our 'notional' analysis.
- **PC by PC calculations for actual risk:** This details the data and precise method used for each PC, to calculate our 'actual' company-specific risk range. Information on individual PCs can be found by using the following links:
  - Per Capita Consumption
  - Leakage
  - Supply Interruptions
  - Unplanned Outage
  - CRI
  - Quality Contacts
  - Mains Repairs
  - Biodiversity
  - Operational Greenhouse Gas Emissions
  - Serious Pollution Incidents
  - Discharge Permit Compliance
  - Whole Life Carbon
  - AIM
  - Low Pressure
  - C-MeX
  - D-MeX

# DETAILS OF APPROACH AND PC-BY-PC RESULTS

# KEY DETAILS OF OUR APPROACH: IN LINE WITH OFWAT'S GUIDANCE, WE RELY MAINLY ON HISTORICAL EVIDENCE TO PRODUCE OUR ODI AND MEX RISK RANGES.

This annex provides further information about the data used and calculations performed to reach our set of three RoRE risk ranges for ODIs. Broadly speaking, risk ranges are calculated for each performance commitment individually, before being aggregated into an overall risk range for ODIs and MeX as a whole, using a Monte Carlo simulation. Further details of our use of Monte Carlo models is outlined in Annex F. This approach is consistent across our 'actual' company specific risk analysis; and our 'notional' risk analysis. Differences in our approach between these two types of risk analysis are explained below.

**'Actual' company-specific analysis**

- We use a combination of historical analysis and expert judgement to calculate a risk range for Affinity, depending on the availability of historical data. For the following PCs there is sufficient historical data, so we do not require expert judgement: PCC; Leakage; Mains Repairs; Quality Contacts; C-MeX; and D-MeX.
- For some PCs, where we have limited historical data, we supplement this with expert judgement regarding likely performance and target levels over AMP8. We weight the expert judgment and historical data using a ratio of 1:2 (acknowledging Ofwat's preference for the use of historical evidence), before implementing our calculations. The PCs for which this approach is taken are: Supply interruptions; Unplanned outage; and CRI.
- For new PCs at PR24 there is no historical data, so we use expert judgment only. This is required for: Biodiversity; Operational greenhouse gas emissions; Discharge permit compliance; Serious pollution incidents; Whole life carbon (bespoke); AIM (bespoke); and Low pressure (bespoke).

**'Notional' analysis**

- For our 'notional' analysis, we have relied solely on historical data for the four 'notionally efficient' firms.
- This means that we are unable to calculate a risk range for PCs where there is no historical data. The PCs that we are therefore unable to include in our analysis are: Biodiversity; Operational greenhouse gas emissions; Discharge permit compliance; Serious pollution incidents; Whole life carbon (bespoke); AIM (bespoke); and Low pressure (bespoke).
- The implication of this is that the risk range produced under our 'notional' analysis is expected to underestimate the full extent of the risk on PCs. We would expect the range to widen significantly with the inclusion of the above 7 PCs.

# KEY DETAILS OF OUR APPROACH: A STEP-BY-STEP OUTLINE OF HOW WE MODEL ODI AND MEX RISK.

Below outlines precisely how we have calculated the ODI and MeX RoRE risk ranges. This is used for both our 'actual' company-specific, and 'notional' risk analysis.

- **STEP 1:** Obtain PCL estimates for each year of PR24 for each performance commitment. Affinity has provided us with their own PCL estimates to use in our 'actual' risk analysis. For the notional firms, firm-specific PCLs are estimated based on a combination of long-term statutory requirements and PCLs in previous price control periods.
- **STEP 2:** Calculate the likely performance ranges for a firm, measured as a percentage of the PCL. To calculate the risk range for Affinity, we analyse past performance, supplementing it with expert judgment where data is lacking. For the notional analysis, the performance range is calculated using historical analysis only.
- **STEP 3:** Using the likely performance range relative to the PCL alongside the forecasted PCL, calculate the expected performance on each PC during each year of PR24.
- **STEP 4:** Apply the PR24 ODI rate, as provided by Ofwat, to the expected performance, to convert performance estimates into the expected penalty / reward for the firm, for each PC.
- **STEP 5:** Apply any caps, collars, and enhanced incentives to the payments (if necessary).
- **STEP 6:** Convert these £s payments for each PC into % RoRE, using RCV and gearing projections.
- **STEP 7:** For each firm, combine the individual ODI payments into a single net penalty / reward payment, using a Monte Carlo simulation, applying the aggregate sharing mechanism should the calculated payment exceed Ofwat's chosen thresholds. These are set at +/- 3% and +/- 5% of notional regulatory equity.

# RESULTS SUMMARY: OUR ANALYSIS SHOWS A NEGATIVELY SKEWED ODI AND MEX RISK RANGE FOR BOTH AFFINITY AND THE NOTIONALLY EFFICIENT FIRM.

**Table: 'Actual' and 'notional' RoRE risk results for ODIs and MeX**

| ODI | EI Ofwat compliant actual risk analysis (actual risk under notional capital structure) | | EI actual risk analysis (actual risk under actual capital structure) | | EI notional risk analysis (notional risk under notional capital structure) | |
|---|---|---|---|---|---|---|
| | P10 | P90 | P10 | P90 | P10 | P90 |
| PCC | -1.94% | 0.79% | -4.21% | 1.72% | -1.35% | -0.68% |
| Leakage | -0.62% | 0.12% | -1.35% | 0.26% | -0.53% | -0.07% |
| Supply Interruptions | -0.50% | 0.14% | -1.09% | 0.31% | -0.18% | -0.06% |
| Unplanned Outage | 0.04% | 0.25% | 0.09% | 0.54% | 0.07% | 0.10% |
| CRI | -0.08% | 0.00% | -0.17% | 0.00% | -0.08% | -0.05% |
| Quality Contacts | -0.34% | -0.04% | -0.74% | -0.09% | -0.20% | 0.00% |
| Mains Repairs | -0.15% | 0.25% | -0.32% | 0.54% | -0.11% | 0.24% |
| C-MeX | -0.26% | -0.10% | -0.58% | -0.22% | -0.02% | 0.23% |
| D-MeX | -0.05% | 0.01% | -0.11% | 0.01% | -0.01% | 0.01% |
| Biodiversity | -0.30% | 0.30% | -0.65% | 0.65% | N/A | N/A |
| Greenhouse Gas Emissions | -0.16% | 0.20% | -0.35% | 0.44% | N/A | N/A |
| Discharge Permit Compliance | -0.15% | 0.00% | -0.32% | 0.00% | N/A | N/A |
| Serous Pollution Incidences | -0.27% | 0.00% | -0.60% | 0.00% | N/A | N/A |
| Whole Life Carbon | -0.18% | 0.16% | -0.40% | 0.35% | N/A | N/A |
| AIM | -0.01% | 0.14% | -0.03% | 0.30% | N/A | N/A |
| Low Pressure | -0.10% | 0.05% | -0.22% | 0.11% | N/A | N/A |
| **Total (simple aggregation)** | **5.07%** | **2.27%** | **-11.05%** | **4.92%** | **-2.41%** | **-0.28%** |
| **Total (Monte Carlo aggregation)** | **-3.11%** | **0.85%** | **-6.75%** | **1.84%** | **-1.80%** | **-0.81%** |

*Source: Economic Insight analysis*

# RESULTS SUMMARY: WHILE THE RISK RANGE FOR THE 'NOTIONALLY EFFICIENT' FIRM IS CONSIDERABLY NARROWER THAN FOR AFFINITY, WE CONSIDER THAT THIS IS LARGELY A RESULT OF A LACK OF HISTORICAL DATA FOR NEW PCs.

- As shown on the previous slide, our results show that the risk range for ODIs and MeX are heavily skewed to the downside, when modelling both 'actual' company-specific RoRE risk for Affinity; and 'notional' risk.
- While the 'notional' risk range is considerably narrower than for Affinity, we consider this is, in part, a result of a lack of historical data for new PCs. We should also note that, owing to our inability to model new PCs at PR24 for the purposes of our 'notional' analysis, our results are highly sensitive to individual PCs that are included. This can introduce greater skew to the overall results, should firms systematically underperform on a particular performance commitment.
- We consider that the strong downwards skew to our results is a function of:
  - **The removal of bespoke ODIs at PR24**. Companies historically have been more likely to underperform on common ODIs; and have tended to outperform on bespoke ODIs. In previous price controls, this has had the effect of 'balancing out' the rewards and payments received on ODIs. The removal of bespoke ODIs at PR24 therefore has the effect of shifting the likely distribution of rewards and payments to the downside.
  - **The increase in reward and penalty rates proposed at PR24**. Ofwat's indicative ODI rates for PR24 are significantly larger than at PR19. Combining this feature of the incentive package with the removal of bespoke ODIs above results in the likely financial payments over AMP8 across the industry being far larger, and more skewed towards the downside.
- In each of the methods, Per Capita Consumption (PCC) has by far the most negative P10. This suggests that for both Affinity and the 'notional' firm, PCC is likely to be the performance commitment that results in the single largest penalty payment under Ofwat's methodology.
- In the remainder of this annex, we include the data inputs used to generate our 'actual' company-specific risk ranges, for full transparency and for our results to be replicable. We do not include detail of our 'notional' analysis, due to the similarities between both approaches, but can provide this information upon request.

# PC-BY-PC CALCULATIONS FOR ‘ACTUAL’ RISK

# PER CAPITA CONSUMPTION: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- The table below shows the target performance level; the outturn performance level achieved by Affinity on PCC; and the percentage variation of this performance from the target level. At the right hand-side of the table, we calculate the P10 and P90 of this historical performance compared to the PCL. As shown, at the P10, Affinity underperformed against the PCL by 10.1%, and at the P90, Affinity outperformed against the PCL by 4.1%.

**Table: Affinity's performance on PCC, measured in litres per person per day (3-year average)**

| | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Target** | 158.4 | 156.3 | 155.6 | 153.3 | 150.3 | 147.4 | 152.5 | 147.5 | 143.8 | | |
| **Performance** | 149.5 | 150.5 | 151.9 | 152.6 | 155.0 | 155.1 | 161.8 | 161.5 | 161.7 | | |
| **% variation of performance from PCL** | -5.6% | -3.7% | -2.4% | -0.5% | 3.1% | 5.2% | 6.1% | 9.5% | 12.4% | 10.1% | -4.1% |

*Source: EI analysis of Ofwat data*

- Per Capita Consumption has plausibly been subject to a temporary Covid-induced increase between 2020-21 and 2021-22.
- It is possible to drop these years, however, we choose not to because: (i) doing so reduces the (already small) sample size; and (ii) this shock may persist somewhat throughout AMP8, so these data points do reflect the potential performance of Affinity over the 5-year period.

# PER CAPITA CONSUMPTION: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For PCC, enhanced incentives apply for very high outperformance, at twice the standard rate. We have set the threshold at which these kick in as 10% past the performance level of the industry frontier firm, using industry historical data. This represents our view of enhanced thresholds at PR24.
- No (standard) caps and collars are required, but an enhanced cap applies at 1% RoRE.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive between a ~£19m penalty, through to a ~£8m reward in each year.
- Converting this to % RoRE, the risk range for PCC is therefore between -1.94% and 0.79% RoRE on a notional basis, and -4.21% and 1.72% on an actual basis.
- These values do not surpass the thresholds at which enhanced incentives or caps apply, since the cap is set at 1% RoRE calculated using the notional gearing ratio.

**Table: Implied performance and payments for Affinity from PCC in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (l/h/d) | 136.2 | 135.7 | 135.2 | 134.9 | 134.3 |
| Implied P10 performance | 149.9 | 149.3 | 148.8 | 148.5 | 147.8 |
| Resultant payment in P10 case (£m) | **-£19.17** | **-£19.10** | **-£19.03** | **-£19.00** | **-£18.91** |
| Implied P90 performance | 130.6 | 130.1 | 129.7 | 129.4 | 128.8 |
| Resultant payment in P90 case (£m) | **£7.83** | **£7.81** | **£7.78** | **£7.76** | **£7.73** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £1.41m / unit |
| Enhanced incentive rate | £2.82m / unit |
| Cap | 1% RoRE (calculated using notional gearing) |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -1.94% | -4.21% |
| P90 | 0.79% | 1.72% |

# LEAKAGE: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- The table below shows the target performance level; the outturn performance level achieved by Affinity on leakage; and the percentage variation of this performance from the target level. At the right hand-side of the table, we calculate the P10 and P90 of this historical performance compared to the PCL. As shown, at the P10, Affinity underperformed against the PCL by 12.1% and at the P90, Affinity outperformed against the PCL by 2.3%.

**Table Affinity's performance on leakage, measured in Megalitres per day**

| | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Target | 189.3 | 183.9 | 178.5 | 173.1 | 167.7 | 162.2 | 183.7 | 167.8 | 162.4 | | |
| Performance | 183.5 | 182.2 | 179.1 | 178.4 | 186.1 | 188.8 | 185.5 | 168.9 | 159.0 | | |
| % variation of performance from PCL | -3.1% | -0.9% | 0.4% | 3.0% | 11.0% | 16.4% | 1.0% | 0.7% | -2.1% | 12.1% | -2.3% |

*Source: EI analysis of Ofwat data*

# LEAKAGE: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For leakage, enhanced incentives apply for very high outperformance, at twice the standard rate. We calculate the threshold at which these kick in as 10% past the performance level of the industry frontier firm, using industry historical data. This represents our estimate of enhanced thresholds at PR24, as these are yet to be confirmed by Ofwat.
- No (standard) caps and collars are required, but an enhanced cap applies at 1% RoRE.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive between a ~£6.5m penalty, through to a ~£1.2m reward in each year.
- Converting this to a % RoRE, the risk range for leakage is therefore between -0.62% and 0.12% RoRE on a notional basis, and -1.35% and 0.26% on an actual basis.
- These values do not surpass the thresholds at which enhanced incentives or caps apply.

**Table: Implied performance and payments for Affinity from leakage in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (Ml/d) | 149.2 | 146.3 | 139.7 | 135.9 | 132.2 |
| Implied P10 performance | 167.1 | 164.0 | 156.6 | 152.3 | 148.1 |
| Resultant payment in P10 case (£m) | -£6.49 | -£6.37 | -£6.08 | -£5.92 | -£5.75 |
| Implied P90 performance | 145.7 | 143.0 | 136.5 | 132.8 | 129.1 |
| Resultant payment in P90 case (£m) | £1.24 | £1.22 | £1.17 | £1.13 | £1.10 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.37m / unit |
| Enhanced incentive rate | £0.74m / unit |
| Cap | 1% RoRE (calculated using notional gearing) |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.62% | -1.35% |
| P90 | 0.12% | 0.26% |

# SUPPLY INTERRUPTIONS: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Since there are only three years of historical data for supply interruptions, we use a weighted average of historical analysis and expert judgment of performance on this PC. We combine the P10 and P90s from the historical analysis and expert judgement using a weighted average, with a 2/3 weighting on historical analysis and a 1/3 weighting on expert judgment.
- The table at the top right shows the target performance level; the outturn performance level achieved; and the percentage variation of performance from the target level. We also calculate the P10 and P90 of this historical performance compared to the PCL. The tables to the bottom right illustrate the expert judgment of P10s and P90s, and the weighted average of expert and historical performance. As shown, we expect Affinity to underperform by 131-159% at the P10 and outperform by 33-38% at the P90, depending on the year.

**Table: Past performance on supply interruptions, measured in minutes lost per property**

| | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|
| Target | 00:06:30 | 00:06:08 | 00:05:45 | | |
| Performance | 00:05:49 | 00:03:43 | 00:12:53 | | |
| % variation of performance from PCL | -10.5% | -39.4% | 123.9% | 97.0% | -33.6% |

*Source: EI analysis of Ofwat data*

**Table: Expert judgment of supply interruptions performance**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 200.0% | 217.0% | 236.0% | 257.5% | 281.8% |
| P90 | -46.4% | -43.4% | -40.0% | -36.2% | -31.8% |

*Source: Data provided by Affinity*

**Table: Weighted average of expert judgement and historical analysis**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 131.4% | 137.0% | 143.4% | 150.5% | 158.6% |
| P90 | -37.9% | -36.9% | -35.7% | -34.5% | -33.0% |

# SUPPLY INTERRUPTIONS: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For supply interruptions, enhanced incentives apply for very high outperformance, at twice the standard rate. We calculate the threshold at which these kick in as 10% past the performance level of the industry frontier firm, using industry historical data. This represents our estimate of enhanced thresholds at PR24.
- There is no cap for supply interruptions but Ofwat plan to implement a collar. This is required under the P10 scenario.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive between a ~£4.9m penalty, through to a ~£1.6m reward in each year.
- In terms of % RoRE, the risk range for supply interruptions is therefore between -0.50% and 0.14% RoRE on a notional basis, and -1.09% and 0.31% on an actual basis.
- In the P10 scenario, the -0.5% RoRE collar is required, resulting in a payment of -£4.92m in each year. This is also true under actual gearing, but since the collar is calculated on a notional basis, the point at which the collar kicks in is -1.09% RoRE using actual regulatory equity.

**Table: Implied performance and payments for Affinity from supply interruptions in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (HH:MM:SS) | 00:04:40 | 00:04:25 | 00:04:10 | 00:03:55 | 00:03:40 |
| Implied P10 performance | 00:10:48 | 00:10:28 | 00:10:08 | 00:09:49 | 00:09:29 |
| Resultant payment in P10 case (£m) | **-£4.92** | **-£4.92** | **-£4.92** | **-£4.92** | **-£4.92** |
| Implied P90 performance | 00:02:54 | 00:02:47 | 00:02:41 | 00:02:34 | 00:02:27 |
| Resultant payment in P90 case (£m) | **£1.62** | **£1.49** | **£1.41** | **£1.28** | **£1.11** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.91m / unit |
| Enhanced incentive rate | £1.82m / unit |
| Cap | N/A |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.50% | -1.09% |
| P90 | 0.14% | 0.31% |

# UNPLANNED OUTAGE: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Since there are only three years of historical data for unplanned outage, we use a weighted average of historical analysis and expert judgment of performance on this PC. We combine the P10 and P90s from the historical analysis and expert judgement using a weighted average, with a 2/3 weighting on historical analysis and a 1/3 weighting on expert judgment.
- The table to the top right shows the target performance level; the outturn performance level achieved; and the percentage variation of performance from the target level. We also calculate the P10 and P90 of this historical performance compared to the PCL. The tables to the bottom right illustrate the expert judgment of P10s and P90s, and the weighted average of expert and historical performance. As shown, we expect Affinity to underperform by 6-10% at the P10 and overperform by ~59% at the P90, varying slightly year-on-year.

**Table: Past performance on unplanned outage, measured in percentage of peak week production capacity**

| | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|
| Target | 2.34 | 2.34 | 2.34 | | |
| Performance | 1.65 | 1.19 | 2.09 | | |
| % variation of performance from PCL | -29.4% | -49.1% | -10.7% | -14.4% | -45.2% |

*Source: EI analysis of Ofwat data*

**Table: Expert judgment of unplanned outage performance**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 11.2% | 7.6% | 4.2% | 1.6% | -0.6% |
| P90 | -87.1% | -87.3% | -87.5% | -87.6% | -87.8% |

*Source: Data provided by Affinity*

**Table: Weighted average of expert judgement and historical analysis**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | -5.9% | -7.1% | -8.2% | -9.1% | -9.8% |
| P90 | -59.2% | -59.2% | -59.3% | -59.3% | -59.4% |

# UNPLANNED OUTAGE: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For unplanned outage, Ofwat plans to set a cap at 0.25% RoRE and a collar at -0.5% RoRE, as is standard for asset health measures.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive a reward between £0.31m and £2.46m depending on the outcome and the year.
- Measured as a % RoRE, the risk range for unplanned outage is therefore between 0.04% and 0.25% RoRE on a notional basis, and 0.09% and 0.54% RoRE on an actual basis. We do not expect Affinity to incur any penalty payments.
- At the P90, the cap is required in order to limit the scale of the outperformance payments to 0.25% RoRE, calculated on a notional basis. This limits the outperformance payment to £2.46m in each year.

**Table: Implied performance and payments for Affinity from unplanned outage in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (%) | 3.07 | 3.05 | 3.04 | 3.02 | 3.00 |
| Implied P10 performance | 2.89 | 2.83 | 2.79 | 2.75 | 2.71 |
| Resultant payment in P10 case (£m) | **£0.31** | **£0.37** | **£0.42** | **£0.46** | **£0.50** |
| Implied P90 performance | 1.25 | 1.24 | 1.24 | 1.23 | 1.22 |
| Resultant payment in P90 case (£m) | **£2.46** | **£2.46** | **£2.46** | **£2.46** | **£2.46** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £1.63m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.25% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | 0.04% | 0.09% |
| P90 | 0.25% | 0.54% |

# CRI: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Since there are only three years of historical data for CRI, we use a weighted average of historical analysis and expert judgment of performance on this PC. We combine the P10 and P90s from the historical analysis and expert judgement using a weighted average, with a 2/3 weighting on historical analysis and a 1/3 weighting on expert judgment.
- The table to the top right shows the target performance level (measured here as the deadband); the outturn performance level achieved; and the percentage variation of performance from the target level. We also calculate the P10 and P90 of this historical performance compared to the PCL. The tables to the bottom right illustrate the expert judgment of P10s and P90s, and the weighted average of expert and historical. As shown, we expect Affinity to underperform by 82-85% at the P10 and operate below the deadband level by 39-41% at the P90, depending on the year.

**Table: Performance on CRI, measured as CRI score**

| | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|
| Target (deadband) | 2.00 | 2.00 | 2.00 | | |
| Performance | 1.31 | 0.87 | 1.09 | | |
| % variation of performance from PCL | -34.5% | -56.5% | -45.5% | -36.7% | -54.3% |

*Source: EI analysis of Ofwat data*

**Table: Expert judgment on CRI performance**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 325.7% | 322.4% | 320.3% | 319.4% | 328.8% |
| P90 | -13.0% | -11.2% | -9.4% | -7.5% | -11.1% |

*Source: Data provided by Affinity*

**Table: Weighted average of expert judgement and historical analysis**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 84.1% | 83.0% | 82.3% | 82.0% | 85.1% |
| P90 | -40.5% | -39.9% | -39.3% | -38.7% | -39.9% |

# CRI: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- There are no caps, collars, or enhanced incentives for this PC. However, no outperformance payments are possible since the PCL is set at zero, alongside a deadband.
- As shown in the table at the top right, applying the P10 and P90 variation from the deadband observed in the past to the expected PCL over PR24, indicates that Affinity can expect to receive a penalty of up to £0.8m in the P10 scenario, with no reward possible under any scenario.
- Converting these values to % RoRE, the risk range for CRI is between -0.08% and 0% RoRE on a notional basis, and -0.17% and 0% on an actual basis.

**Table: Implied performance and payments for Affinity from CRI in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 deadband (CRI score) | 1.00 | 0.98 | 0.96 | 0.94 | 0.90 |
| Implied P10 performance | 1.84 | 1.79 | 1.75 | 1.71 | 1.67 |
| Resultant payment in P10 case (£m) | **-£0.81** | **-£0.79** | **-£0.77** | **-£0.75** | **-£0.74** |
| Implied P90 performance | 0.59 | 0.59 | 0.58 | 0.58 | 0.54 |
| Resultant payment in P90 case (£m) | **£0.00** | **£0.00** | **£0.00** | **£0.00** | **£0.00** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.98m / unit |
| Enhanced incentive rate | N/A |
| Cap | N/A |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.08% | -0.17% |
| P90 | 0.00% | 0.00% |

# QUALITY CONTACTS: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- The table below shows the target performance level; the outturn performance level achieved by Affinity on quality contacts; and the percentage variation of this performance from the target level. At the right hand-side of the table, we calculate the P10 and P90 of this historical performance compared to the PCL. As shown, at the P10, Affinity underperformed against the PCL by 51.2% and at the P90, Affinity also underperformed against the PCL by 6.3%.

**Table: Affinity's performance on quality contacts, measured in number of contacts per 10,000 population**

| | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Target | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.67 | 0.67 | 0.67 | | |
| Performance | 1.07 | 0.98 | 0.96 | 0.83 | 0.82 | 0.81 | 0.83 | 0.75 | 0.56 | | |
| % variation of performance from PCL | 62.1% | 48.5% | 45.5% | 25.8% | 24.2% | 22.7% | 23.9% | 11.9% | -16.4% | 51.2% | 6.3% |

*Source: EI analysis of Ofwat data*

# QUALITY CONTACTS: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- No caps, collars or enhanced incentives are required for quality contacts at PR24.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive a penalty of between £0.4m and £3.4m.
- Converting this to % RoRE, the risk range for quality contacts is between -0.34% and -0.04% RoRE on a notional basis, and -0.74% and -0.09% RoRE on an actual basis.

**Table: Implied performance and payments for Affinity from quality contacts in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (number of contacts) | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 |
| Implied P10 performance | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 |
| Resultant payment in P10 case (£m) | -£3.36 | -£3.36 | -£3.36 | -£3.36 | -£3.36 |
| Implied P90 performance | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 |
| Resultant payment in P90 case (£m) | -£0.42 | -£0.42 | -£0.42 | -£0.42 | -£0.42 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £9.87m / unit |
| Enhanced incentive rate | N/A |
| Cap | N/A |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.34% | -0.74% |
| P90 | -0.04% | -0.09% |

# MAINS REPAIRS: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- The table below shows the target performance level; the outturn performance level achieved by Affinity on mains repairs; and the percentage variation of this performance from the target level. At the right hand-side of the table, we calculate the P10 and P90 of this historical performance compared to the PCL. As shown, at the P10, Affinity underperformed against the PCL by 7.5% and at the P90, Affinity outperformed against the PCL by 32.2%.

**Table: Affinity's performance on mains repairs, measured in repairs per 1,000km of water mains**

| | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Target | 186.8 | 186.6 | 186.3 | 185.8 | 185.3 | 184.6 | 150.7 | 148.6 | 146.5 | | |
| Performance | 145.5 | 132.5 | 185.0 | 175.2 | 151.5 | 125.4 | 158.9 | 100.2 | 169.6 | | |
| % variation of performance from PCL | -22.1% | -29.0% | -0.7% | -5.7% | -18.2% | -32.1% | 5.4% | -32.6% | 15.8% | 7.5% | -32.2% |

*Source: EI analysis of Ofwat data*

# MAINS REPAIRS: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For mains repairs, Ofwat plan to set a cap at 0.25% RoRE and a collar at -0.5% RoRE, as is standard for asset health measures.
- As shown in the table at the top right, applying the P10 and P90 variation from the PCL observed in the past to the expected PCL over PR24 indicates that Affinity can expect to receive between a ~£1.5m penalty, through to a ~£2.5m reward in each year.
- Converting this to % RoRE, the risk range for mains repairs is between -0.15% and 0.25% RoRE on a notional basis, and -0.32% and 0.54% RoRE on an actual basis.
- At the P90, the cap is required in order to limit the scale of the outperformance payments to 0.25% RoRE, calculated on a notional basis.

**Table: Implied performance and payments for Affinity from mains repairs in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (number of repairs) | 140.0 | 138.0 | 136.0 | 134.0 | 132.0 |
| Implied P10 performance | 150.5 | 148.5 | 146.5 | 144.5 | 142.5 |
| Resultant payment in P10 case (£m) | -£1.51 | -£1.49 | -£1.46 | -£1.44 | -£1.42 |
| Implied P90 performance | 94.9 | 92.9 | 90.9 | 88.9 | 86.9 |
| Resultant payment in P90 case (£m) | £2.46 | £2.46 | £2.46 | £2.46 | £2.46 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.15m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.25% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.15% | -0.32% |
| P90 | 0.25% | 0.54% |

# BIODIVERSITY: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Ofwat are introducing biodiversity as a new common performance commitment at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- The table below shows Affinity's best view of performance on biodiversity in each year, calculated as a percentage of the estimated PCL for that year. At the P10, Affinity expect to underperform by between 20% and 41% of the PCL. Note that 'higher biodiversity' is 'better' so the P10 is at a level lower than the PCL. At the P90, Affinity also expect to outperform by between 20% and 41%.

**Table: Affinity's expert judgment of performance on biodiversity, as a percentage of the estimated PCL**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | | | -20.4% | -20.4% | -40.7% |
| P90 | | | 20.4% | 20.4% | 40.7% |

*Source: Data provided by Affinity Water*

No data was provided by Affinity for 2025-26 and 2026-27

# BIODIVERSITY: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For biodiversity, Ofwat invites companies to propose their own ODI rate – Affinity have provided us with such a rate.
- Caps and collars are set at 0.5% RoRE and -0.5% RoRE respectively, using notional gearing.
- As shown in the table at the top right, applying the expert judgement of P10 and P90 performance to the expected PCL over PR24 indicates that Affinity can expect to receive between a £4.9m penalty, through to a £4.9m reward in each year.
- Measured as a % RoRE, the risk range is -0.30% and 0.30% RoRE on a notional basis, and -0.65% and 0.65% on an actual basis.
- The caps and collars do kick in at both the P10 and P90, although the notional P10 and P90 are equal to ± 0.3% rather than ± 0.5% as we only have data for 3 out of 5 years of AMP8.

**Table: Implied performance and payments for Affinity from biodiversity in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (units per 100 km$^2$) | | | 1.08 | 1.08 | 0.54 |
| Implied P10 performance | | | 0.86 | 0.86 | 0.32 |
| Resultant payment in P10 case (£m) | | | -£4.92 | -£4.92 | -£4.92 |
| Implied P90 performance | | | 1.30 | 1.30 | 0.76 |
| Resultant payment in P90 case (£m) | | | £4.92 | £4.92 | £4.92 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £23.4m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.5% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.30% | -0.65% |
| P90 | 0.30% | 0.65% |

# OPERATIONAL GREENHOUSE GAS EMISSIONS: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Ofwat are introducing operational greenhouse gas emissions as a new common performance commitment at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- The table below shows Affinity's best view of performance on operational greenhouse gas emissions in each year, calculated as a percentage of the estimated PCL for that year. At the P10, Affinity expect to underperform by around 7% of the PCL. At the P90, Affinity expect to overperform by around 8-9% of the PCL.

**Table: Affinity's expert judgment of performance on operational GHG emissions, as a percentage of the estimated PCL**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 7.3% | 7.2% | 7.0% | 6.9% | 6.5% |
| P90 | -8.6% | -8.9% | -9.0% | -8.3% | -8.7% |

*Source: Data provided by Affinity Water*

# OPERATIONAL GREENHOUSE GAS EMISSIONS: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- For operational GHG emissions, Ofwat invites companies to propose their own ODI rate – Affinity have provided us with such a rate.
- Caps and collars are set at 0.5% RoRE and -0.5% RoRE respectively, using notional gearing.
- As shown in the table at the top right, applying the expert judgement of P10 and P90 performance to the expected PCL over PR24 indicates that Affinity can expect to receive a penalty of between £0.9m and £2.3m at the P10 scenario, and a reward of between £1.3m and £2.7m in the P90 scenario.
- Converting this to % RoRE, the risk range for GHG emissions is between -0.16% and 0.20% RoRE on a notional basis, and -0.35% and 0.44% on an actual basis.
- The expected payments do not reach the threshold at which either the cap or collar is required.

**Table: Implied performance and payments for Affinity from GHG emissions in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (tonnes CO2e) | 127.4 | 113.3 | 91.0 | 74.3 | 58.5 |
| Implied P10 performance | 136.7 | 121.4 | 97.4 | 79.4 | 62.3 |
| Resultant payment in P10 case (£m) | **-£2.27** | **-£1.97** | **-£1.55** | **-£1.25** | **-£0.93** |
| Implied P90 performance | 116.4 | 103.2 | 82.8 | 68.1 | 53.4 |
| Resultant payment in P90 case (£m) | **£2.73** | **£2.50** | **£2.03** | **£1.53** | **£1.26** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.25m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.5% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.16% | -0.35% |
| P90 | 0.20% | 0.44% |

# SERIOUS POLLUTION INCIDENTS: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Ofwat are introducing serious pollution incidents as a new common performance commitment for WoCs at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- Since the proposed PCL for serious pollution incidents is set at zero in each year, it is not feasible to perform the required analysis in terms of percentage of the PCL. Instead, we perform the analysis in terms of the actual difference from the PCL.
- The table below shows Affinity's best view of performance on serious pollution incidents in each year, in terms of the number of incidents per year. At the P10, Affinity expect to have 2 serious pollution incidents. At the P90, Affinity expect to have no serious pollution incidents. There is no chance of outperformance on this PC given the PCL is set at zero.

**Table: Affinity's expert judgment of performance on serious pollution incidents**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 2 | 2 | 2 | 2 | 2 |
| P90 | 0 | 0 | 0 | 0 | 0 |

*Source: Data provided by Affinity Water*

# SERIOUS POLLUTION INCIDENTS: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- No caps or collars are required for serious pollution incidents.
- As shown in the table at the top right, the expected performance from the P10 and P90 scenarios indicates that Affinity can expect to receive a penalty of up to £2.7m in each year. There is no possibility of receiving reward payments.
- Converting this to % RoRE, the risk range for serious pollution incidents is between -0.27% and 0% on a notional basis, and -0.60% and 0% on an actual basis.

**Table: Implied performance and payments for Affinity from serious pollution incidents in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (number of incidents) | 0 | 0 | 0 | 0 | 0 |
| Implied P10 performance | 2 | 2 | 2 | 2 | 2 |
| Resultant payment in P10 case (£m) | -£2.70 | -£2.70 | -£2.70 | -£2.70 | -£2.70 |
| Implied P90 performance | 0 | 0 | 0 | 0 | 0 |
| Resultant payment in P90 case (£m) | £0 | £0 | £0 | £0 | £0 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £1.36m / unit |
| Enhanced incentive rate | N/A |
| Cap | N/A |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.27% | -0.60% |
| P90 | 0% | 0% |

# DISCHARGE PERMIT COMPLIANCE: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Ofwat are introducing discharge permit compliance as a new common performance commitment for WoCs at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- The table below shows Affinity's best view of performance on discharge permit compliance in each year, calculated as a percentage of the estimated PCL for that year. At the P10, Affinity expect to underperform by around 9% of the PCL. Note that 'higher' discharge permit compliance is 'better', so the P10 is at a level lower than the PCL. At the P90, there is no chance of outperformance, since the PCL is set at 100% compliance.

**Table: Affinity's expert judgment of performance on discharge permit compliance, as a percentage of the estimated PCL**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | -8.7% | -8.7% | -8.7% | -8.7% | -8.7% |
| P90 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

*Source: Data provided by Affinity Water*

# DISCHARGE PERMIT COMPLIANCE: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- No caps or collars are required for discharge permit compliance.
- As shown in the table at the top right, applying the expert judgement of P10 and P90 performance to the expected PCL over PR24 indicates that Affinity can expect to receive a penalty of up to -£1.5m in each year. There is no possibility of reward payments for this PC.
- Converting these values to % RoRE, the risk range for discharge permit compliance is between -0.15% and 0% on a notional basis, and -0.32% and 0% on an actual basis.

**Table: Implied performance and payments for Affinity from discharge permit compliance in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (%) | 100% | 100% | 100% | 100% | 100% |
| Implied P10 performance | 91.3% | 91.3% | 91.3% | 91.3% | 91.3% |
| Resultant payment in P10 case (£m) | -£1.46 | -£1.46 | -£1.46 | -£1.46 | -£1.46 |
| Implied P90 performance | 100% | 100% | 100% | 100% | 100% |
| Resultant payment in P90 case (£m) | £0 | £0 | £0 | £0 | £0 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.17m / unit |
| Enhanced incentive rate | N/A |
| Cap | N/A |
| Collar | N/A |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.15% | -0.32% |
| P90 | 0% | 0% |

# WHOLE LIFE CARBON: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Affinity are proposing whole life carbon as a bespoke performance commitment at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- The table below shows Affinity's best view of performance on whole life carbon in each year, calculated as a percentage of the estimated PCL for that year. At the P10, Affinity expect to underperform by between 57.9% and 84.3%. Note that 'higher' whole life carbon is 'better', so the P10 is at a level lower than the PCL. At the P90, Affinity also expect to outperform by between 57.9% and 84.3%.

**Table: Affinity's expert judgment of performance on whole life carbon, as a percentage of the estimated PCL**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | | -84.3% | -71.9% | -63.8% | -57.9% |
| P90 | | 84.3% | 71.9% | 63.8% | 57.9% |

*Source: Data provided by Affinity Water*

No data was provided by Affinity for 2025-26

# WHOLE LIFE CARBON: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- Affinity have proposed a bespoke cap equal to 0.2% RoRE (calculated using notional gearing) alongside a collar equal to 0.5% RoRE.
- As shown in the table at the top right, applying the expert judgement of P10 and P90 performance to the expected PCL over PR24 indicates that Affinity can expect to receive between a £2.2m penalty, through to a £2.0m reward in each year.
- Converting this to a % RoRE, the risk range for whole life carbon is between -0.18% and 0.16% RoRE on a notional basis, and -0.40% and 0.35% on an actual basis.
- The cap is required at the P90 level, although the PR24 average percentage RoRE shown does not equal this cap (0.2%), since one year of data is missing from the AMP.

**Table: Implied performance and payments for Affinity from whole life carbon in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (%) | 8.0% | 9.5% | 11.1% | 12.5% | 13.8% |
| Implied P10 performance | | 8.0% | 8.0% | 8.0% | 8.0% |
| Resultant payment in P10 case (£m) | | **-£2.24** | **-£2.24** | **-£2.24** | **-£2.24** |
| Implied P90 performance | | -8.0% | -8.0% | -8.0% | -8.0% |
| Resultant payment in P90 case (£m) | | **£1.97** | **£1.97** | **£1.97** | **£1.97** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.28m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.2% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.18% | -0.40% |
| P90 | 0.16% | 0.35% |

# AIM: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Affinity are proposing AIM as a bespoke performance commitment at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- Since the proposed PCL for AIM is set at zero in each year, it is not feasible to perform the required analysis in terms of percentage of the PCL. Instead, we perform the analysis in terms of the actual difference from the PCL.
- The table below shows Affinity's best view of performance on AIM in each year. At the P10, Affinity expect to miss their target of zero by 100 Ml. At the P90, Affinity outperform against their target by 1,000 Ml.

**Table: Affinity's expert judgment of performance on AIM, measured in Ml**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 100 | 100 | 100 | 100 | 100 |
| P90 | -1,000 | -1,000 | -1,000 | -1,000 | -1,000 |

*Source: Data provided by Affinity Water*

# AIM: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- Affinity have proposed caps and collars for this PC equal to 0.5% RoRE and -0.5% RoRE respectively, using notional gearing.
- As shown in the table at the top right, the expected performance from the P10 and P90 scenarios indicates that Affinity can expect to receive between a -£0.13m penalty, through to a £1.36m reward in each year. Caps and collars are not required.
- Converting these values to a % RoRE, the risk range for AIM is between -0.01% to 0.14% RoRE on a notional basis, and -0.03% and 0.30% on an actual basis.

**Table: Implied performance and payments for Affinity from AIM in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (Ml) | 0 | 0 | 0 | 0 | 0 |
| Implied P10 performance | 100 | 100 | 100 | 100 | 100 |
| Resultant payment in P10 case (£m) | -£0.13 | -£0.13 | -£0.13 | -£0.13 | -£0.13 |
| Implied P90 performance | -1,000 | -1,000 | -1,000 | -1,000 | -1,000 |
| Resultant payment in P90 case (£m) | £1.36 | £1.36 | £1.36 | £1.36 | £1.36 |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.001m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.5% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.01% | -0.03% |
| P90 | 0.14% | 0.30% |

# LOW PRESSURE: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- Affinity are proposing low pressure as a bespoke performance commitment at PR24. We do not have any historical data for this PC so use Affinity's expert judgment to construct our view of the likely performance range over AMP8. We have been provided with expert opinion on P10 and P90 levels for each year of AMP8.
- The table below shows Affinity's best view of performance on low pressure in each year, calculated as a percentage of the estimated PCL for that year. At the P10, Affinity expect to underperform by between 52% and 58%. At the P90, Affinity expect to outperform by between 26% and 29%.

**Table: Affinity's expert judgment of performance on low pressure, measured in property minutes**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| P10 | 51.7% | 52.6% | 55.7% | 56.8% | 57.8% |
| P90 | -25.9% | -26.3% | -27.9% | -28.4% | -28.9% |

*Source: Data provided by Affinity Water*

# LOW PRESSURE: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- Affinity have proposed caps and collars equal to 0.5% RoRE and -0.5% RoRE respectively, using notional gearing.
- As shown in the table at the top right, applying the expert judgement of P10 and P90 performance to the expected PCL over PR24 indicates that Affinity can expect to receive between a -£0.98m penalty, through to a £0.49m reward in each year.
- Converting these values to a % RoRE, the risk range for low pressure is between -0.10% to 0.05% RoRE on a notional basis, and -0.22% and 0.11% on an actual basis. Given this, caps and collars are not required.

**Table: Implied performance and payments for Affinity from low pressure in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (HH:MM:SS) | 01:55:58 | 01:54:00 | 01:47:41 | 01:45:43 | 01:43:45 |
| Implied P10 performance | 02:55:58 | 02:54:00 | 02:47:41 | 02:45:43 | 02:43:45 |
| Resultant payment in P10 case (£m) | **-£0.98** | **-£0.98** | **-£0.98** | **-£0.98** | **-£0.98** |
| Implied P90 performance | 01:25:58 | 01:24:00 | 01:17:41 | 01:15:43 | 01:13:45 |
| Resultant payment in P90 case (£m) | **£0.49** | **£0.49** | **£0.49** | **£0.49** | **£0.49** |

**Table: Incentive rates and caps/collars**

| | |
|---|---|
| Indicative PR24 Rate | £0.016m / unit |
| Enhanced incentive rate | N/A |
| Cap | 0.5% RoRE (calculated using notional gearing) |
| Collar | -0.5% RoRE (calculated using notional gearing) |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.10% | -0.22% |
| P90 | 0.05% | 0.11% |

# C-MEX: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- We perform a historical analysis of Affinity's past performance on C-MeX to generate a view of the likely C-MeX score that Affinity can expect to achieve over PR24. We consider C-MeX in terms of actual scores rather than difference from the PCL (or median in this case) due to the nature of Ofwat's calculation of C-MeX payments.
- Affinity's performance on C-MeX is compared to the industry median. We assume that there is no trend in industry C-Mex scores over the four years for which there is data, taking the industry median score over this time as the C-MeX target.
- Below illustrates Affinity's performance on C-MeX between 2019 and 2023, alongside Affinity's P10 and P90 scores calculated from this data.

**Table: Affinity's C-MeX score in each year of AMP7**

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|
| Performance | 72.7 | 77.9 | 76.6 | 74.6 | 73.3 | 77.5 |

*Source: EI analysis of Ofwat data*

# C-MEX: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- From the P10 and P90 performance ranges observed in the data, we can calculate the resultant payment. We use the same calculation as at PR19, given the lack of information provided for PR24. This is as follows:
  - $if\ score > median: \frac{score-median}{max-median}$
  - $if\ score < median: \frac{score-median}{median-min}$
  - $if\ score = median: 0$
- The result of this calculation is then multiplied by 18% of the annual allowed residential revenue, as per Ofwat's final methodology.
- As shown in the table at the top right, the resultant payment range that Affinity can expect to receive stretches from -£2.61m under the P10 scenario to -£0.92m in the P90 scenario.
- Converting this to a % RoRE results in a risk range for C-MeX of -0.26% to -0.10% under notional gearing, and of -0.58% to -0.22% under actual gearing

**Table: Implied performance and payments for Affinity from C-MeX in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (median) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 |
| Implied P10 performance | 73.3 | 73.3 | 73.3 | 73.3 | 73.3 |
| Resultant payment in P10 case (£m) | -£2.61 | -£2.61 | -£2.61 | -£2.61 | -£2.61 |
| Implied P90 performance | 77.5 | 77.5 | 77.5 | 77.5 | 77.5 |
| Resultant payment in P90 case (£m) | -£0.92 | -£0.92 | -£0.92 | -£0.92 | -£0.92 |

**Table: Figures for C-MeX payment calculations**

| | |
|---|---|
| Median industry score | 79.8 |
| Affinity's annual allowed residential retail revenue (£m) | £26.32 |
| Percentage applied | 18% |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.26% | -0.58% |
| P90 | -0.10% | -0.22% |

# D-MEX: UNDERSTANDING THE LIKELY PERFORMANCE RANGE OVER PR24 FOR AFFINITY.

- We calculate D-MeX payments in largely the same way as C-MeX. We perform a historical analysis of Affinity's past performance on D-MeX to generate a view of the likely D-MeX score that Affinity can expect to achieve over PR24. We consider D-MeX in terms of actual scores rather than difference from the PCL (or median in this case), due to the nature of Ofwat's calculation of D-MeX payments.
- Affinity's performance on D-MeX is compared to the industry median performance. We assume that there is no trend in industry D-MeX scores over the four years for which there is data, taking the industry median score over this time as the D-MeX target.
- Below illustrates Affinity's performance on D-MeX between 2019 and 2023, alongside Affinity's P10 and P90 scores calculated from this data.

**Table: Affinity's D-MeX score in each year of AMP7**

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | P10 | P90 |
|---|---|---|---|---|---|---|
| Performance | 74.4 | 84.4 | 85.5 | 86.4 | 77.4 | 86.1 |

*Source: EI analysis of Ofwat data*

# D-MEX: CONVERTING LIKELY PERFORMANCE TO A RORE RISK RANGE.

- From the P10 and P90 performance ranges observed in the data, we can calculate the resultant D-MeX payment. We use the same calculation as at PR19, given the lack of information provided for PR24. This is as follows:
  - $if\ score > median: \frac{score-median}{max-median}$
  - $if\ score < median: \frac{score-median}{median-min}$
  - $if\ score = median: 0$
- The result of this calculation is then multiplied by 6% of the annual actual developer services revenue if an outperformance payment, or 12% of developer services revenue if an underperformance payment, as per Ofwat's Final Methodology.
- As shown in the table at the top right, the resultant payment range that Affinity can expect to receive stretches from -£0.51m under the P10 scenario to £0.07m in the P90 scenario.
- Converting this to a % RoRE results in a risk range for D-MeX of -0.05% to 0.01% under notional gearing, and of -0.11% to 0.01% under actual gearing.

**Table: Implied performance and payments for Affinity from D-MeX in AMP8**

| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|
| PR24 PCL (median) | 85.6 | 85.6 | 85.6 | 85.6 | 85.6 |
| Implied P10 performance | 77.4 | 77.4 | 77.4 | 77.4 | 77.4 |
| Resultant payment in P10 case (£m) | -£0.51 | -£0.51 | -£0.51 | -£0.51 | -£0.51 |
| Implied P90 performance | 86.1 | 86.1 | 86.1 | 86.1 | 86.1 |
| Resultant payment in P90 case (£m) | £0.07 | £0.07 | £0.07 | £0.07 | £0.07 |

**Table: Figures for D-MeX payment calculations**

| | |
|---|---|
| Median industry score | 85.6 |
| Affinity's annual actual developer services revenue (£m) | £10.80 |
| Outperformance % applied | 6% |
| Underperformance % applied | 12% |

**Table: RoRE impact**

| % RoRE (PR24 average) | Notional gearing | Actual gearing |
|---|---|---|
| P10 | -0.05% | -0.11% |
| P90 | 0.01% | 0.01% |

# ANNEX E: PCD RISK

# INTRODUCTION AND CONTEXT: AT PR24, OFWAT HAS INTRODUCED PRICE CONTROL DELIVERABLES (PCDs), A FINANCIAL INCENTIVE INTENDED TO PROTECT CUSTOMERS FROM PARTIAL OR LATE DELIVERY OF ENHANCEMENT PROJECTS.

- At PR24, Ofwat has introduced a new type of incentive, Price Control Deliverables (PCDs), into the Outcomes framework. The purpose of PCDs is to protect customers from partial or late delivery of enhancement projects.
- PCDs, combined with outcome delivery incentives (ODIs) and the cost sharing mechanism, are intended to work to ensure that customers are compensated for *more* than the allowed cost of any under-delivered / late enhancement projects, reflecting foregone benefits.[1] As a result, companies will be worse off if they fail to deliver the total funded improvement within AMP8, thereby providing a financial incentive for full and timely delivery.
- Ofwat expects companies to propose PCDs in their Business Plans (linking these proposals to the Quality and Ambition Assessment (QAA)),[2] where:
  - **The benefits of the investment are not directly linked to, or fully protected by, ODIs**. This will occur where: (i) benefits will be delivered beyond AMP8; (ii) benefits can't be mapped directly to performance commitment levels; (iii) ODI rates are significantly below (<60% of) the average unit cost of performance; and (iv) collars on ODI payments mean customers aren't fully protected.[3]
  - **The investment is material.** Ofwat's materiality threshold for inclusion in a PCD is >1% of relevant totex.[4]
- Further guidance on PCD proposals provided by Ofwat specify that: (i) proposals should be more outcomes than output focused, to maintain flexibility with regards to 'how' companies achieve the desired outcomes; and (ii) enhancement lines can be aggregated into one PCD, where the outcome being measured is the same.[5]
- Ofwat expects between 60% to 80% of enhancement expenditure across the industry will be protected by PCDs.[6]

# KEY ISSUES: PCDs ARE, IN THE MAIN, A DOWNSIDE ONLY INCENTIVE THAT HAS NOT BEEN CAPTURED IN OFWAT'S RoRE METHOD, NOR INDICATIVE RISK RANGES.

- Due to PCDs being a new addition to the Outcomes framework at PR24, there is a degree of uncertainty as to how they will function at this time. In addition, whilst PCDs will be largely 'downside only' (with only limited potential for upside, should projects be delivered early), there is a lack of evidence or information from which the *scale* of any impacts can be inferred. Notably, Ofwat has not yet captured PCD risk in its RoRE method, nor indicative ranges.
- Having reviewed Ofwat's position with regards to PCDs, we have identified four key challenges that require further consideration, which we summarise to the right.
- Given these challenges, it is crucial for Affinity to have a way of robustly quantifying the RoRE risk that may arise under the PCD proposals being submitted as part of its plan. This is for two key reasons:
  - First, so that the Board can understand the potential exposure that results from the PCDs being proposed, and can therefore confidently sign off on these proposals; and
  - Second, so that Affinity can constructively engage with the regulator to arrive at a well-considered approach, by the time of its determinations.

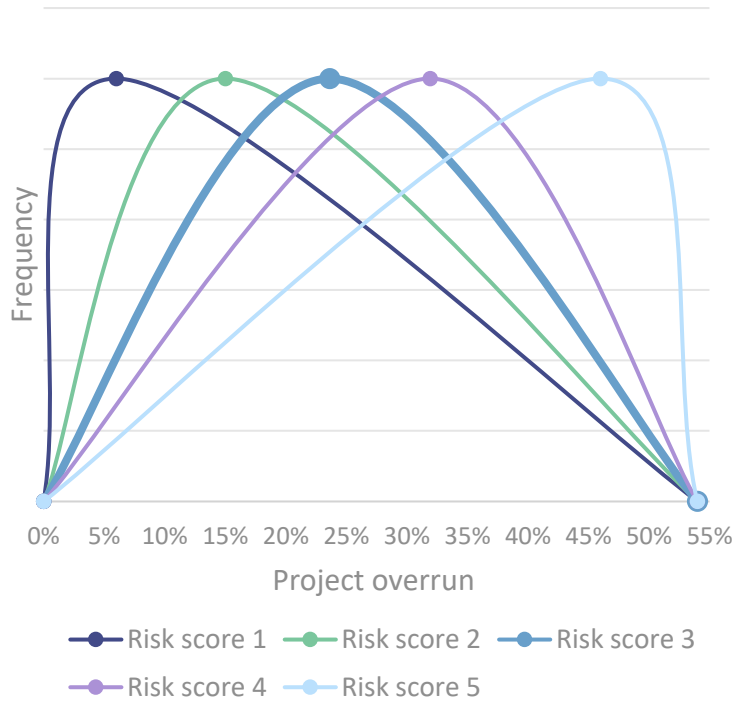
**The 4 key challenges associated with PCDs**

- **Double count risk.** In a regulated network industry, intuitively, all schemes contribute to outcomes. While it may not be possible to 'directly' map individual schemes to ODIs/PCs, in reality all schemes will be linked to the key outcomes that PCs measure. The introduction of PCDs therefore risks a 'double count' that penalises companies and investors twice.
- **Penalties are based on average costs.** Under Ofwat's proposals, the payment rate on PCDs will be the *average unit cost* for any undelivered outputs/outcomes, plus an uplift for foregone customer benefit. However, when a company under-delivers (i.e. less output/outcome is delivered in a particular year than expected), the company would likely only avoid the *marginal cost* on undelivered units. Therefore, the penalty rate should be based on the marginal cost of undelivered units, or else companies will be overcharged. However, as is well documented, obtaining a robust view of marginal costs in the water industry is difficult.
- **Incentive distortion.** If PCDs are too extensive, they risk 'locking in' companies to certain options/outputs, even if they are inconsistent with what is best for customers and the environment. Whilst Ofwat aims to guard against this by stipulating that PCDs ought to be more outcomes than output focused, widespread use of PCDs will inevitably limit the flexibility companies have.
- **Increased investor risk.** A degree of delivery performance will be due to non-diversifiable risk. In addition, PCDs increase regulatory discretion. They are also, in the main, downside only. As a result of these factors, PCDs work to increase risk to investors.

# OUR WORK: WE HAVE BEEN COMMISSIONED BY AFFINITY WATER TO QUANTIFY THE RoRE RISK OF PCDs OVER AMP8. TO DO THIS, OUR FIRST STEP INVOLVED ESTIMATING THE RANGE OF POSSIBLE PROJECT DELAYS, USING THIRD-PARTY DATA.

- With this in mind, Affinity Water has commissioned us to provide an analysis of the RoRE risk that the company is exposed to over AMP8, in relation to PCDs. To do this, we have undertaken two key steps.
- **Step 1. First, we have conducted an analysis of the likely length of delays that could be experienced on capital and enhancement projects over the AMP8 period, based on historical evidence of delays to UK construction projects.**
  - Specifically, we have used third-party capital project and construction delay data provided by Cornerstone[7] to construct a triangular probability distribution of the length of project delays for the 'average' UK project. We cross-check this distribution against a set of case studies of 9 major construction projects completed in the UK in the last 35 years.
  - We then modify this distribution to allow for the risk to vary across the individual PCDs. To do this we simply vary the 'most likely' outcome (or in other words, we adjust where the top of the triangular probability distribution falls). This is to reflect whether, compared to the 'average' UK project, Affinity considers specific individual projects to be more, or less, likely to experience delays; but also ensures that the full range of possible outcomes remains consistent with the data.
  - In total, we create 5 different distributions, which can be mapped to Affinity's internal assessment of individual project risk (scored by the company on a scale of 1-5). We have interpreted a risk score of 3 to be approximately equal to the overall (average) risk; a score of 1-2 to indicate that the delay risk is lower than the average; and a risk score of 4-5 to indicate it is higher than the average. These are illustrated in the figure to the right.

**Figure: Delay distributions corresponding to risk scores 1-5**




*Source: EI analysis of Cornerstone delay data*

# OUR WORK: WE THEN USED THIS ANALYSIS OF THIRD-PARTY DATA IN CONJUCTION WITH AFFINITY'S CURRENT PCD PROPOSALS TO ESTIMATE THE RANGE OF POSSIBLE FINANCIAL IMPACTS.

- **Step 2. We combine our analysis on project delays for UK projects with Affinity's PCD proposals, to obtain a RoRE risk range.**
  - For each of Affinity's five proposed PCDs, we assign the appropriate distribution of delay risks for UK projects, as set out on the previous slide, using Affinity's internal risk assessment.
  - We apply the P10, most likely, and P90 delay lengths from the relevant distribution to each proposal; and use these to calculate the range of possible PCD penalties that would result under each scenario. In doing so, we model both the PCD non-delivery payment, and time incentive payment.
  - We aggregate the range of possible financial outcomes across PCDs using a Monte Carlo model, to reflect the fact that it is unlikely for Affinity to perform at the 'extreme' ends of the distribution for all PCDs simultaneously. Please see Annex F for further details on our use of Monte Carlo models.
- **Step 3. We then feed these results into our 'actual' company-specific risk analysis, and 'notional' analysis.**
  - To incorporate into our 'actual' company-specific analysis, we simply express the risk range obtained as % of regulatory equity, using both 'notional' and Affinity 'actual' projected gearing (55% and 79% respectively).
  - To incorporate into our 'notional' analysis, we use the risk range for Affinity's PCDs as calculated using notional gearing (since we do not have access to our 'notionally efficient' companies' proposals) and downscale this risk to reflect Ofwat's expectations regarding the proportion of enhancement expenditure that will be included in PCDs. Specifically, Ofwat expects that across the industry, between 60% to 80% of enhancement spend will be included in PCDs. Affinity's proposals cover 75.3% of its enhancement totex – near the top end of this range. We therefore downscale the expected financial impacts to reflect the likely risk should only 70% of enhancement be included in PCDs (taking the midpoint of Ofwat's expectation).
  - The above results are then incorporated into the relevant Monte Carlo models used to produce the overall risk ranges.

# RESULTS: OUR RESULTS SUGGEST THAT AFFINITY FACES A RISK RANGE ON PCDs OVER AMP8 OF BETWEEN -1.68% AND -0.54% (RoRE), USING OFWAT'S NOTIONAL GEARING RATIO; AND -3.66% AND -1.19% USING AFFINITY'S ACTUAL PROJECTED GEARING RATIO.

- The Cornerstone data indicates that the 'average' project overrun that Affinity can expect across its PCDs is 23.86%, with the P10 and P90 delay scenarios being equal to 4.77% and 47.97% of the projected project length, respectively. When factoring in varying project-specific risk, the P10 reaches as low as 0.33% and the P90 as high as 52.40%. Our case study review broadly aligns with our analysis of Cornerstone data, indicating that the 'average' project overrun Affinity can expect is 31%, with a P10 of 0% and a P90 of 64%.
- By applying these findings on likely project overruns to Affinity's PCD proposals, we find that the RoRE at risk as a result (due to both the time incentive and non-delivery payments that would be incurred over AMP8), is between -1.68% (P10) and -0.54% (P90) when using notional gearing, and -3.66% and -1.19% using actual gearing.
- As was set out on the previous slide, we have modified the 'actual' company-specific risk (calculated using notional gearing) for inclusion in our notional risk analysis. Specifically, we have downscaled the risk range based on the proportion of total enhancement spend that Ofwat expects to be included in PCDs over PR24. This results in a narrower risk range for the notional firm of between -1.56% to -0.51%.
- These results are summarised in the table below.

**Table: Summary of PCD RoRE risk range**

| Risk analysis type | Gearing used | P10 | P90 |
|---|---|---|---|
| 'Actual' | Notional gearing (55%) | -1.68% | -0.54% |
| | Actual projected gearing (79%) | -3.66% | -1.19% |
| 'Notional' | Notional gearing (55%) | -1.56% | -0.51% |

*Source: Economic Insight analysis*

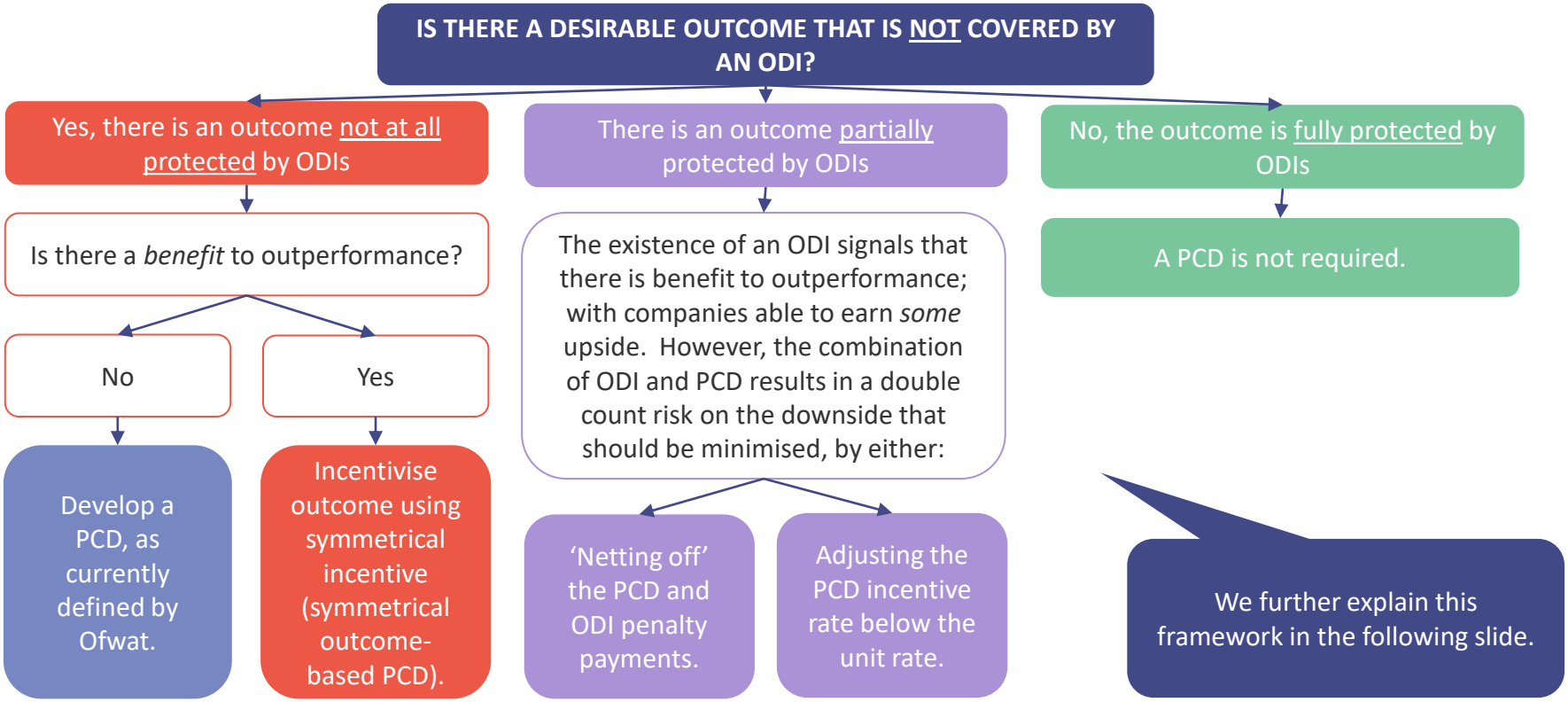
This analysis is completed based on Affinity's PCD proposals as of 13/09/23 at 14:04.

As shown in the above table, if nothing changes (in terms of both Ofwat's design of PCD incentives; and Affinity's current PCD proposals), PCDs add a material additional downside RoRE skew to the incentive package at PR24.

# RECOMMENDATIONS: GIVEN THIS, WE RECOMMEND THAT AFFINITY ENGAGE WITH OFWAT TO HIGHLIGHT THE POTENTIAL DOWNSIDE SKEW BROUGHT ABOUT BY PCDs; AND WORK CONSTRUCTIVELY TO REFINE THE DESIGN OF THE INCENTIVE.

- One method for dealing with this additional downside risk with a view to balancing the package of incentives, would be to simply offset it through a higher cost of equity. However, we agree with Ofwat's position that any asymmetry should ideally be addressed at the source.[8] In order to address the issue 'at source', and to ensure the incentive package is optimally calibrated, we consider that the 'need for', and 'design of', PCDs should be considered using the following framework.

Framework for considering the 'need for' and 'design of' PCDs



# RECOMMENDATIONS: WE CONSIDER THAT PCDs AS CURRENTLY DEFINED ARE ONLY APPROPRIATE FOR OUTCOMES THAT ARE: (i) NOT ALREADY PROTECTED BY AN ODI; AND (ii) FOR WHICH THERE IS NO BENEFIT OF OUTPERFORMANCE.

- If there is a **desirable outcome that is not already protected by an ODI**, it should first be confirmed whether or not there is any *benefit* to outperformance. This is because, if customers would stand to benefit from companies surpassing their targets, the incentive should be symmetrical, and designed much like an ODI. Ofwat's own framework appears to align with this view, as the regulator distinguishes between PCDs and bespoke ODIs in the following way:

  "*We are using a different term, 'price control deliverable', to distinguish between a mechanism to return funding to customers for investment or outputs that have not been delivered, and performance commitments which are monitoring outcomes, where there is benefit in outperforming commitment levels*."[9] [Emphasis added].

- Therefore, where companies can evidence that the PCD: (i) links enhancement to 'outcomes' (which, by Ofwat's guidelines, it should); and (ii) there is a benefit to outperformance, we consider that these should be converted into 'symmetrical PCDs'.

- If there is a **desirable outcome that is fully protected by an ODI**, in line with Ofwat's guidance, we would consider that a PCD is not required here; as the ODI alone will be sufficient to ensure that customers are protected.

- If there is a **desirable outcome that is partially protected by an ODI**, this signals that there *is* benefit to outperformance, and due to the existence of the ODI, companies have *some* opportunity for upside.

- However, there is a risk of double count on the downside. For the incentive to be appropriately calibrated, this double count risk will need to be minimised. This can either be done by: (i) netting off the ODI and PCD payments; or (ii) recalibrating the incentive rate. Regards (ii); at present, the PCD rate is set by calculating the unit cost, and PCDs are to be used where the ODI rate is less than 60% of this unit cost. However, the PCD rate is not then adjusted to account for the proportion of the unit cost already received by customers if the ODI rate is somewhere between 0% and 60%. We would recommend a mechanistic adjustment is made in the setting of the incentive rate to account for this.

- **PCDs as currently defined, are therefore only appropriate for outcomes that are not protected by ODIs; and where there is no benefit of outperformance**. We consider that for the vast majority of outcomes in the water industry, there will be benefit to outperformance. Therefore, in practice, we suggest that the use of PCDs as currently defined should be limited.

# RECOMMENDATIONS: WHILE ENGAGEMENT WITH THE REGULATOR IS ONGOING, WE RECOMMEND THAT AFFINITY MINIMISES THE RISK FACED BY PCDs BY REFINING ITS OWN PCD PROPOSALS.

- We would encourage Affinity to engage with Ofwat on the issues identified here, highlighting the additional downside risk that PCDs incorporate into the incentive package; and providing Ofwat with the information required to be able to effectively calibrate the incentives, such that it is possible to gain a better 'balance'. **We would be happy to assist in this engagement; including participating in discussions with Ofwat on how to ensure the appropriate calibration of these multiple interlinking incentives.**
- Notwithstanding the above, and in the absence of any fundamental changes to the way PCDs are designed, we would encourage Affinity to minimise the additional downside risk it faces over AMP8 as a result of PCDs, through refining its own Business Plan proposals prior to Plan submission.
- Based on our analysis of Affinity's PCD proposals, we consider that there are a number of options.
  - First, **Affinity could reduce the number (or total value) of PCDs proposed in its Business Plan**, to be in line with Ofwat's expectation that PCDs will protect between 60%-80% of enhancement expenditure. At present, the total value Affinity is proposing to protect via PCDs is towards the upper end of this range, at 75.3%, and therefore there may be scope for Affinity to reduce the extent of these proposals. This could be achieved, in line with our framework, by reconsidering whether there are certain enhancement projects that are better suited to being included in the Business Plan as more symmetrical PCDs (more akin to bespoke ODI), rather than as PCDs.
  - Second, **Affinity could develop proposals for 'netting off'** to also include within its Business Plan, to limit the double count risk. Ofwat is welcoming proposals for netting off at this stage of the process, and therefore this may be a strategically desirable option.

We would be happy to continue working with Affinity to implement these suggestions.

# STRUCTURE OF THIS ANNEX

- The remainder of this annex is structured as follows:
  - **Evidence on capital project and construction delays**. In this section, we present the evidence gathered regarding UK capital project and construction delays that we have used to obtain a probability distribution of delay lengths for Affinity's capital and enhancement projects. This includes both our analysis of Cornerstone data, and our case study review.
  - **Modelling the financial impact of delays over PR24**. In this section, we apply the evidence gathered in the preceding section to Affinity's current PCD proposals, in order to obtain a view of the range of financial impacts Affinity can expect over AMP8 with regards to PCDs, expressed as a percentage return on regulatory equity. Importantly, we combine this evidence on UK delays with Affinity's own expert judgment, in order for likely delay lengths to vary by individual PCD.
  - **References**. The final section includes a list of references used in this annex.

# EVIDENCE ON CAPITAL PROJECT & CONSTRUCTION DELAYS

# WE HAVE ANALYSED THIRD PARTY DATA AND UNDERTAKEN A LITERATURE REVIEW TO BUILD A ROBUST EVIDENCE BASE REGARDING THE LIKELY PROJECT DELAYS THAT AFFINITY MAY FACE OVER AMP8.

- In this section, we detail how we have gathered evidence from multiple sources to estimate the range of likely performance Affinity can expect over AMP8, in relation to the timeliness of delivery of its enhancement projects.
- Specifically, in building this evidence base, we have drawn on the following:
  - **An analysis of third-party capital project and construction delay data**. Specifically, we have used survey data compiled by Cornerstone in 2022,[7] which asks a variety of professionals in the UK construction industry to detail their experience of both the proportion of construction projects that face delays, as well as the extent of these delays.
  - **A case study review of recently completed large UK construction projects.** Specifically, we reviewed 9 UK capital and construction projects spanning from 1988 to 2022 and recorded the extent of any delays to these projects.
- We have relied on the analysis of Cornerstone data to produce a distribution of delay lengths for use in our PCD RoRE model, whilst using our case study review as a 'sense-check' of these results.
- In the following slides, we detail both the data analysis and case study review in turn.

# AN ANALYSIS OF CORNERSTONE DELAY DATA

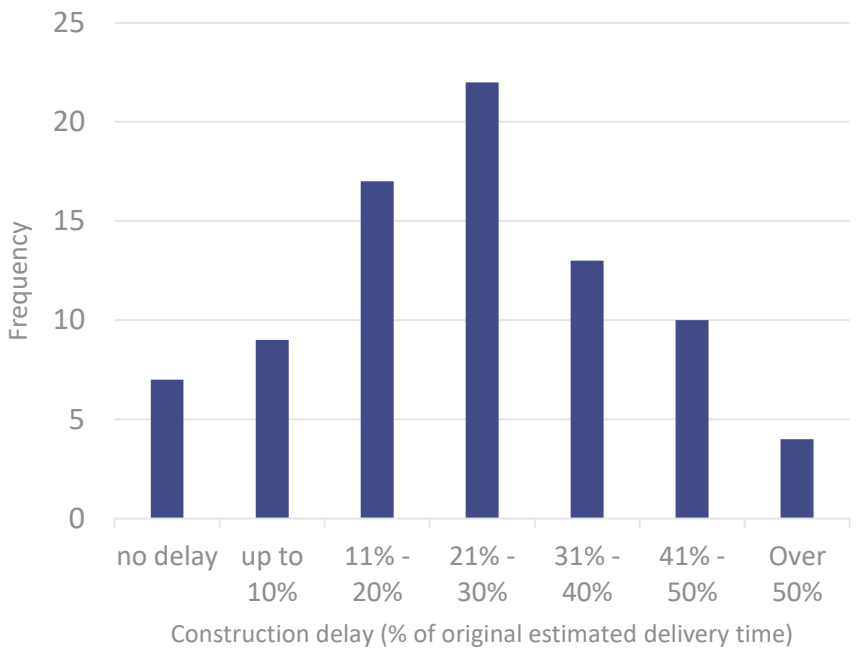
# CORNERSTONE CONSTRUCTION DELAY DATA SHOWS THAT DELAYS IMPACTED OVER 85% OF THOSE IN THE CONSTRUCTION INDUSTRY IN 2022, WITH THE AVERAGE DELAY BEING BETWEEN 21% AND 30% OF THE ORIGINAL ESTIMATED DELIVERY TIME.

- To estimate the risk of non-delivery / delay of PCDs we use third party construction delay data from Cornerstone projects.[7] We consider that the Cornerstone data reasonably represents the delays AFW can expect to face over the next 5-year period as it both recent data (2022) and specific to the UK.
- In 2022, Cornerstone surveyed 82 construction professionals to investigate their experiences of delays in major construction projects. The survey found that delays impacted over 85% of respondents, leading to additional build costs and longer delivery times.
- To model the construction delay risk, we used the responses from the survey question that asked:

  *"Thinking of the last delayed project you have been involved with: what would you estimate the delay to be (as a % of the original estimated delivery time)?"*

- The results were captured as class intervals, illustrated in the chart to the right.

**Figure: Frequency chart of Cornerstone construction delay data**




*Source: Economic Insight analysis of Cornerstone data*

# TO USE THE DATA IN OUR ANALYSIS, WE TRANSFORMED THE SURVEY RESPONSES FROM BEING RECORDED AS FREQUENCIES WITHIN CLASS INTERVALS, TO UNIQUE NUMERICAL VALUES.

- To use the data in our analysis, we had to convert the responses from being recorded as frequencies in class intervals (as shown in the table to the top right), to unique numerical values (as shown in the table to the bottom right). To make this adjustment, we used the following assumptions:
  - All responses recorded as “no delay” were assigned a 0% delay value. We note the caveat that these responses could relate to early delivery, which, in theory, should be reflected by a negative delay percentage. However, in the absence of any further information, we have decided to assign these observations 0%.
  - To obtain unique numerical values for responses across the remaining class intervals, we split the responses within each class interval equally across that interval. An example of this transformation for the class interval “>0% to 10% delay” is illustrated to the right.
  - The exception to the above rule was for the class interval of “over 50%”. Here, the upper boundary is undefined. For the 4 responses which recorded the delay as over 50%, we applied the same intervals between the values as the 41%-50% band. This is a conservative approach to transforming the data, as it results in the highest delay being just 54% when, in reality, it could be significantly higher.

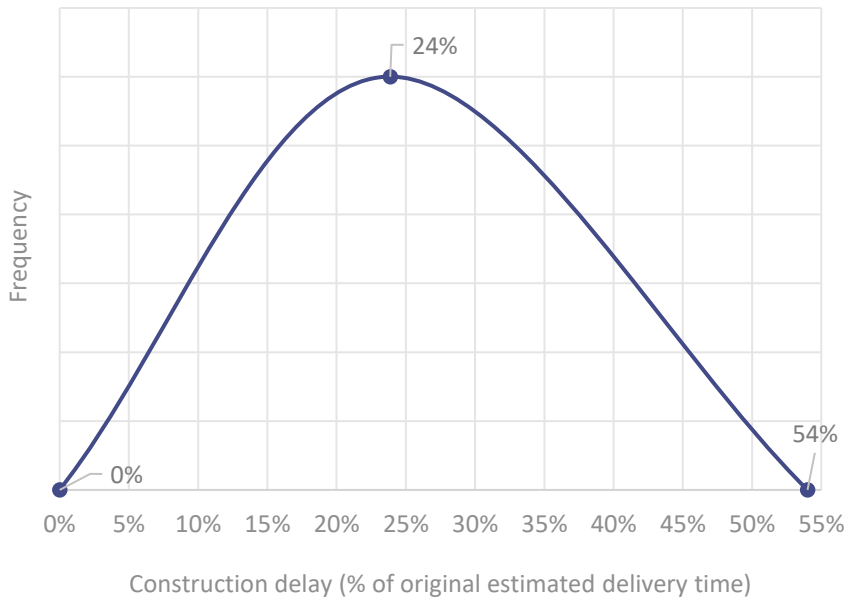
| Delay range % | Frequency |
|---|---|
| Up to 10% (>0 & <=10%) | 9 |

| Delay % | Frequency |
|---|---|
| 1.1% | 1 |
| 2.2 % | 1 |
| 3.3 % | 1 |
| 4.4 % | 1 |
| 5.6 % | 1 |
| 6.6 % | 1 |
| 7.8 % | 1 |
| 8.9 % | 1 |
| 10 % | 1 |

# OUR APPROACH TO USING THIS DATA TO ESTIMATE THE RANGE OF POSSIBLE PROJECT OVERRUNS FOR AFFINITY'S PCDs COMPRISED TWO KEY STEPS.

- Once all the data was transformed from ranges into single values, we were able to plot the distribution of the data. This is illustrated in the figure to the right.
- Overall, the minimum length of construction delay is 0%; the median is 24% and the maximum is 54%. These points are all indicated on the chart.
- Once we obtained the illustrated distribution, we used 2 steps to obtain values for the P10, most likely and P90 project overrun for Affinity specifically.
  - For step 1, we used the overall P10, P50 and P90 values generated from the distribution and then applied this to Affinity's PCDs. This assumes that all Affinity's projects are equally as risky as the 'average UK project'.
  - For step 2, we adjust the distribution obtained from step 1 to allow the risk profile to vary across individual PCDs. Specifically, we generate 5 new distributions based on the above, to align with Affinity's internal risk scores 1-5.
- In the following slides we detail each step, and resultant distributions, in turn.

**Figure: Overall distribution of transformed Cornerstone construction delay data**



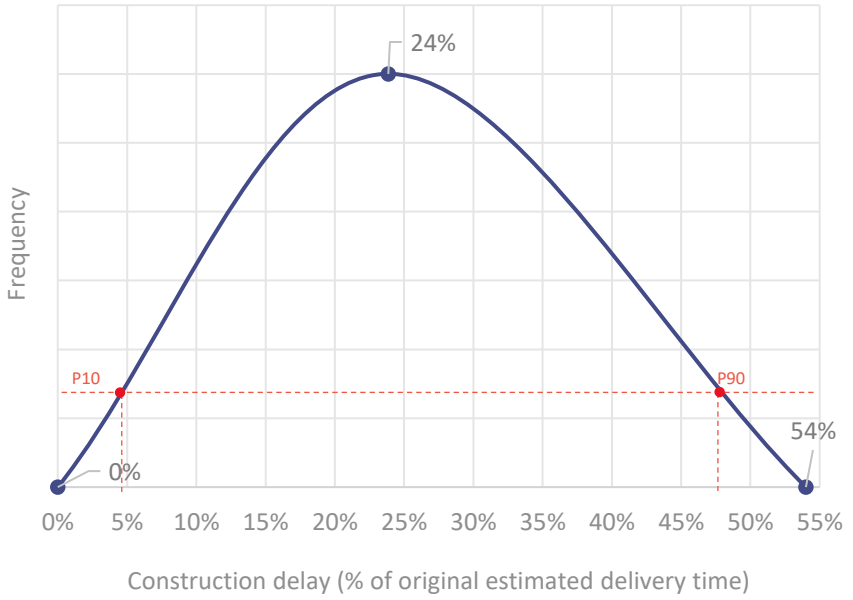

*Source: Economic Insight analysis of Cornerstone data*

# OUR FIRST STEP WAS TO USE THE DATA TO GENERATE AN OVERALL DISTRIBUTION OF PROJECT OVERRUNS FOR THE AVERAGE UK PROJECT. DOING SO SHOWED A P10 PROJECT OVERRUN OF 4.8%, AND A P90 PROJECT OVERRUN OF 48.0%.

1. **Step 1: Overall distribution provided by the data.** We use the maximum, median* and minimum of the overall data to calculate the P10 and P90 delay risks.
   - The P10 is estimated to be 4.8%, which implies that the 'best-case' scenario is that Affinity will take 4.8% longer to deliver the PCD targets than originally planned. The P50 (median) is 23.9% and this represents the 'most likely' scenario and the P90, which represents the 'worst-case' scenario, is equal to 48.0%.
   - As an illustrative example, if Affinity planned to deliver 12 units in one year and the delay was 50%, then it would take 1.5 years to deliver 12 units. If we assume delivery occurs at a constant pace, then only 8 units will be delivered in the first year and the other 4 will be delivered in the first half of the following year.

** We note that the median (P50) is equal to the mean due to the approach we have used to transform the data.*

**Figure: Overall distribution of transformed Cornerstone construction delay data**

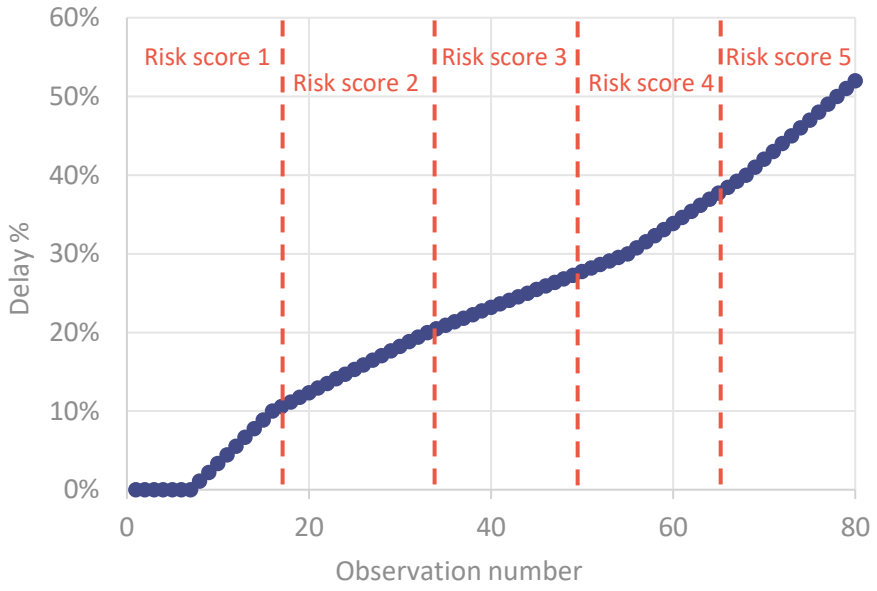



*Source: Economic Insight analysis of Cornerstone data*

# OUR SECOND STEP WAS TO ALLOW FOR THE DISTRIBUTION TO VARY, DEPENDING ON THE ASSIGNED 'RISK SCORE' OF 1 TO 5 PROVIDED BY AFFINITY WATER.

2. **Step 2: Mapping distributions to the risk scores provided by Affinity.** We modify the distribution to allow for the risk to vary across the individual PCDs.
   - Affinity provided us with a risk score for each PCD ranging from 1 (lowest risk) to 5 (highest risk). We have interpreted these scores as follows: a risk score of 3 is approximately equal to the overall (average) risk; a score of 1-2 indicates that the delay risk is lower than the average; and a risk score of 4-5 indicates it is higher than the average.
   - Although the total risk range does not change for each risk score (the minimum remains at 0% and the maximum at 54% for all), the most likely scenario does differ between the different risk scores.
   - To determine the specific distributions appropriate to each risk score, we need to adjust the median to reflect the most likely scenario. To estimate this, we plot the transformed Cornerstone data in ascending order on the chart to the right.
   - We then divide the responses into 5 equal subsections corresponding to the 5 risk scores.
   - Within each section we identify the median delay percentage and subsequently use this to adjust the distributions. This is illustrated overleaf.

**Figure: Overall distribution of transformed Cornerstone construction delay data**

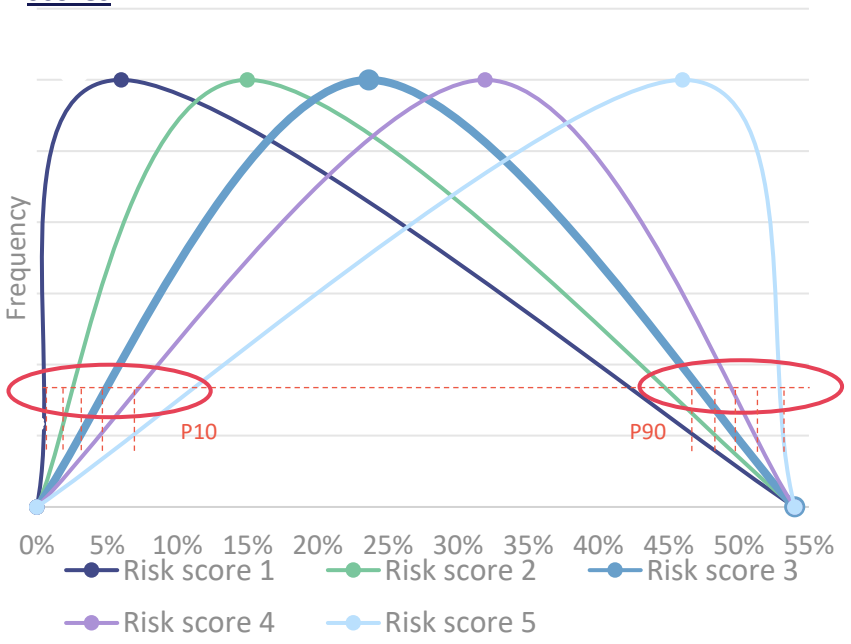



*Source: Economic Insight analysis of Cornerstone data*

# IN IMPLEMENTING THIS SECOND STEP, WE KEPT THE FULL RANGE OF POSSIBLE OUTCOMES THE SAME, IRRESPECTIVE OF THE ASSIGNED RISK SCORE. HOWEVER, FOR EACH SCORE, WE FLEXED THE 'MOST LIKELY' OUTCOME.

- The chart on the right illustrates a stylised example of the 5 different distributions which reflect the risk associated with each of Affinity's risk scores of 1 to 5.
- Note how the minimum and maximum delay percentage is consistent across all 5 risk scores, but they all have different medians. This results in the 'bulk' of the distribution differing between each of them. This is because, for each project, the range of possible outcomes is the same (each project could still be delivered on time or have a delay of up to 54%), however, the most likely outcome will differ between each project which is reflected by the different risk scores.
- As the peak of the distribution (P50) has been shifted towards the right or the left, unique P10 and P90 delay percentages for each of the 5 risk scores arise. This is highlighted in the red circles.
- For example, a risk score of 1 has a P10 of 0.3%; a P50 of 1.7%; and a P90 of 43.5% compared to a risk of score 5 which has a P10 of 9.2%; a P50 of 46.0%; and a P90 of 52.4%.
- Therefore, a PCD with a risk score of 1 will most likely be delayed by 1.7% compared to a PCD with a risk score of 5 which will most likely be delayed by 46.0%.

**Figure: Distributions adjusted to reflect 5 different risk scores**



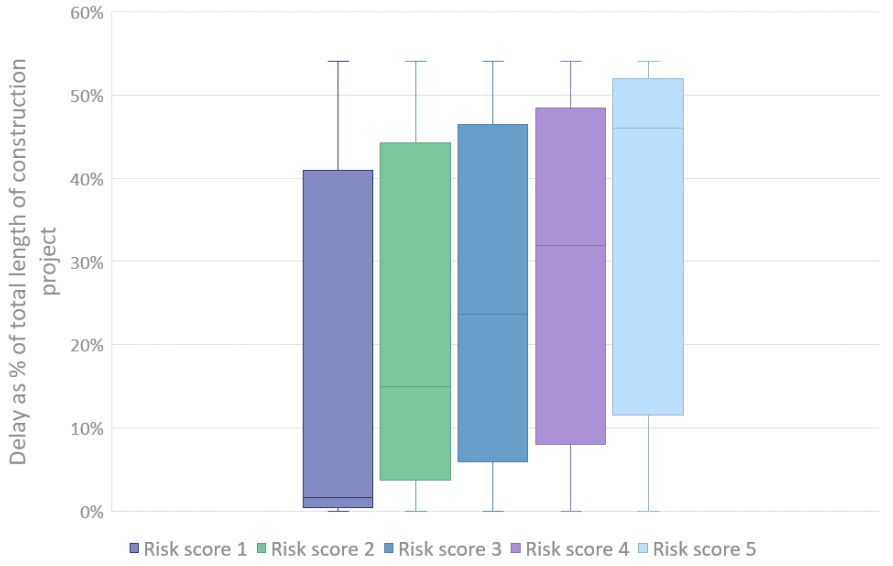

*Source: Economic Insight analysis of Cornerstone data*

# OUR RESULTS IMPLY THAT THE P10 TO P90 RANGE OF POSSIBLE OUTCOMES FOR A LOW-RISK PROJECT IS AN OVERRUN OF BETWEEN 0.3% TO 43.5%; WHILE FOR A HIGH-RISK PROJECT THIS IS BETWEEN 9.2% AND 52.4%.

- In the table below and the chart to the right, we summarise the P10; most likely (P50); and P90 delay scenarios resulting from our analyses.

| Method | Risk score | P10 | P50 | P90 |
|---|---|---|---|---|
| **Step 1:** using the overall distribution of the Cornerstone data to inform the average delay risk | All | 4.8% | 23.9% | 48.0% |
| **Step 2:** adjusting the delay distributions to reflect the risk scores provided by Affinity for each PCD | 1 | 0.3% | 1.7% | 43.5% |
| | 2 | 3.0% | 15.0% | 46.2% |
| | 3 | 4.7% | 23.6% | 47.9% |
| | 4 | 6.4% | 31.9% | 49.6% |
| | 5 | 9.2% | 46.0% | 52.4% |

**Figure: Distributions adjusted to reflect 5 different risk scores**




*Source: Economic Insight analysis of Cornerstone data*

# CASE STUDY REVIEW

# THE DATA GATHERED THROUGH OUR CASE STUDY REVIEW BROADLY ALIGNS WITH THE CORNERSTONE DELAY DATA, INDICATING THAT THE LATTER IS A RELIABLE DATA SOURCE TO USE FOR THE PURPOSES OF RISK ANALYSIS.

- As a cross-check of the data compiled by Cornerstone, we also gathered data regarding the project overrun of major construction projects completed in the UK in the last 35 years.
- Specifically, we looked at 9 UK capital and construction projects spanning from 1988 to 2022. Our approach to selecting these 9 projects was as follows:
  - We limited our review to projects undertaken within the UK, as these are likely to be more indicative of the risk facing the UK water sector's capital and construction projects than projects completed abroad.
  - We also aimed to focus on more recently completed projects – with 4 out of the 9 projects included being completed in the last 5 years. This is because we consider that the more recent past will likely be more indicative of future risk.
- For each of the 9 case studies, we recorded: (i) whether these projects experienced delays; (ii) the extent of these delays (measured as a % of the original estimated delivery time); and (iii) the cause of the delay.
- We used these results to obtain a risk range by calculating the P10, mean* and P90 values of the project overrun across our sample of 9 projects. Our results are presented in the table below, which includes the results of our analysis of the Cornerstone data for comparison.

**Table: Risk ranges implied by our case study review, and analysis of third-party data**

| Approach | P10 | Mean | P90 |
|---|---|---|---|
| Case study review | 0% | 31% | 64% |
| Cornerstone data analysis | 5% | 24% | 48% |

*Source: Economic Insight analysis of Cornerstone data and publicly available information*

- As shown, the distribution of project overrun data produced by both methods are fairly well aligned, and as such, we consider that the Cornerstone data is likely a reliable source of evidence to use for the purposes of this risk analysis. Given that the results of our case study analysis show a slightly wider distribution, it is possible that the Cornerstone data produces a reasonably conservative estimate of possible delays.
- In the following slides, we provide further detail on the case studies used to arrive at the above distribution.

** Given the small sample, we consider the mean to be indicative of the most likely outcome.*

# CASE STUDY REVIEW RESULTS (1).

**Table: Case study review results (1)**

| Project | Date | Project description | Cause of delay | Project overrun |
|---|---|---|---|---|
| The Channel Tunnel[10] | 1988 - 1994 | The construction of the longest undersea tunnel in the world, from southern England (Folkestone) to Northern France (Calais). | This project was delayed due to issues with the Tunnel Boring Machines (TBMs) which ran into unexpected wet and blocky ground. | 20% |
| The London Limehouse Road Tunnel[11] | 1989 - 1993 | The construction of a 1.8km long tunnel under Limehouse linking the eastern part of The Highway to Canary Wharf. | The project was completed on time. | 0% |
| The London Jubilee line extension[12,13] | 1993 - 1999 | The extension of the London Underground Jubilee line from Green Park to Stratford. | The project experienced delays due to the requirement to review and adapt initial tunnelling techniques, as well as problems arising with the untried and untested signaling system. | 38% |
| Heathrow Terminal 5[14,15] | 2002 - 2008 | The construction of an entire airport terminal. | The project was completed on time. | 0% |
| The Thameslink Programme[16,17] | 2007 - 2020 | The enhancement of railway infrastructure and construction of 115 new trains to improve connectivity from north to south London. | The project was delayed due to the Department for Transport and Network Rail failing to plan how services should be introduced and run at the outset of the programme. | 15% |

# CASE STUDY REVIEW RESULTS (2).

**Table: Case study review results (2)**

| Project | Date | Project description | Cause of delay | Project overrun |
|---|---|---|---|---|
| Great Western Railway Modernisation[18,19] | 2010 - 2020 | The modernisation of the Great Western Railway which included electrifcation, re-signalling, new rolling stock and station upgrades. | The project was delayed due to the humid and salty conditions within the tunnel causing problems with the electrical equipment. | 43% |
| Redevelopment of London Bridge Station[20,21] | 2013 – 2018 | The enhancement of the train station to increase both passenger and train capacity. | The project was completed on time. | 0% |
| Scottish Parliament Building[22,23] | 1999 – 2004 | The construction of the Scottish Parliament Building in Holyrood, Edinburgh. | This project was severely delayed due to frequent changes in the scope of the project. | 150% |
| Battersea Power Station Redevelopment[24,25,26] | 2013 - 2022 | The redevelopment of Battersea Power Station into a space which contains shops, cafes, restaurants and more. | This project was delayed due to its vast complexity and issues relating to Brexit. | 13% |

# MODELLING THE FINANCIAL IMPACT OF DELAYS OVER PR24

# BY COMBINING OUR ANALYSIS OF PROJECT OVERRUNS IN THE UK WITH AFFINITY'S PCD PROPOSALS, WE HAVE BEEN ABLE TO ESTIMATE A RANGE OF POSSIBLE FINANCIAL IMPACTS FOR AFFINITY OVER AMP8.

- In this section, we show how we combine our analysis of third-party data on project delays for average UK projects (detailed in the previous section) with Affinity's PCD proposals, to obtain a RoRE risk range.
- We split this section into two parts:
  - First, we detail our overall approach to using the third-party delay data alongside Affinity's proposals to obtain a RoRE risk range, alongside the results produced.
  - Second, we provide a record of the key inputs we have used within our calculations; along with the specific formulae used to calculate the PCD and time delivery incentive payments, in line with Ofwat's worked example.

# OVERALL APPROACH AND RESULTS

# WE HAVE USED AFFINITY'S INTERNAL RISK SCORES FOR EACH SCHEME WITHIN A PCD TO CALCULATE A PCD-SPECIFIC RISK SCORE.

- Our first step was to assign each PCD with the appropriate distribution of delay risk for UK projects (as calculated in section 'An Analysis of Cornerstone Delay Data'), using Affinity's internal assessment of risk. Specifically, we aggregate the scheme risk profiles to the PCD level by taking a simple average of the risk ratings (provided by Affinity) across the schemes that correspond to the PCD in question. For the five PCDs used in our analysis, we find that the risk score is either "2", "3" or "4" (further details on these calculations can be found here).
- In terms of the definition of these scores:
  - Affinity considers a score of 2 to mean: *"There is low complexity of the design and delivery. The work involved is relatively moderate and it will require multiple supply chain delivery. This may require planning."*
  - Affinity considers a score of 3 to mean: *"There is moderate complexity in the design and deliverable as we will be using third parties. There is moderate value work requiring multiple supply chain delivery and we may use a management contractor. The work requires planning and potential for power upgrades for this site."*
  - Affinity considers a score of 4 to mean: *"There is moderate complexity in the design and deliverable as we will be using third parties. There is a high value of work requiring a management contractor and managing multiple suppliers. The work requires planning required and potential for power upgrades for this site."*

# WE HAVE USED THE CALCULATED PCD RISK SCORES TO ASSIGN THE APPROPRIATE DISTRIBUTION OF DELAY RISK DERIVED FROM PUBLICLY AVAILABLE DATA ON CONSTRUCTION PROJECTS.

- We interpret a risk score of 3 as the risk of delay for these projects being in line with the risk of delay for the average UK capital and construction project. We match this across to the delay risks derived from Cornerstone Delay Data to arrive at delay risk ranges. As such, the table shows (for each PCD):
  - Capex over AMP8, with inflators applied – specifically 0.10% for "Resilience", no inflator for "Smart metering", and 0.05% otherwise.
  - The calculated risk score.
  - The P10, P50 and P90 delay values.

**Table: P10, P50 and P90 delay risks for each PCD**

| PCD | Capex over AMP8 (£m) | Risk score | P10 | P50 | P90 |
|---|---|---|---|---|---|
| Supply Side Improvement and Internal Interconnectors - Connect 2050 | £89.0m | 3 | 4.7% | 23.6% | 47.9% |
| Smart metering | £124.5m | 3 | 4.7% | 23.6% | 47.9% |
| Raw Water Quality Deterioration | £89.7m | 3 | 4.7% | 23.6% | 47.9% |
| Sustainable reductions | £125.6m | 4 | 6.4% | 31.9% | 49.6% |
| Resilience | £15.1m | 2 | 3.0% | 15.0% | 46.2% |

*Source: Economic Insight analysis*

# FOR EACH PCD, WE MODEL THE RANGE OF POSSIBLE FINANCIAL OUTCOMES THAT COULD ARISE BASED ON THE RELEVANT PROJECT OVERRUN PROBABILITY DISTRIBUTION.

- Next, we use this information to model the range of possible financial impacts for each PCD over AMP8, as follows:
  - Having selected the relevant project overrun probability distribution for the PCD (based on Affinity's risk score), we calculate the implied outturn delivery in each year of AMP8 compared to the target levels for the P10, most likely, and P90 project overrun.
  - For example, if the P90 scenario is that the project will overrun by 50%, we first calculate how long in total it would take to deliver the outputs planned in AMP8.
  - We then reprofile the number of units that Affinity could expect to deliver in each year of AMP8, based on the delivery profile provided as part of their proposals.
  - This stylised example is illustrated in the tables to the right.

Stylised example of our approach

| | |
|---|---|
| Years in AMP8 | 5 |
| Target units in AMP8 | 30 |
| P90 project overrun | 50% |
| Implied years to deliver total units | 5*(1+50%) = 7.5 |

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total over AMP8 |
|---|---|---|---|---|---|---|
| Delivery profile | 5% | 15% | 20% | 25% | 35% | 100% |
| Target | 1.5 | 4.5 | 6 | 7.5 | 10.5 | 30 |
| P90 outcome | 1 | 3 | 4 | 5 | 7 | 20 |
| **Units delivered late** | **0.5** | **1.5** | **2** | **2.5** | **3.5** | **10** |

# WE INCLUDE BOTH THE PCD NON-DELIVERY INCENTIVE PAYMENT, AND THE TIME INCENTIVE PAYMENT IN THESE CALCULATIONS.

- As shown, this allows us to establish, under each scenario, the number of units in each year of AMP8 that will be delivered 'late'; as well as the number of units that will not be delivered in AMP8.
- This allows us to model the appropriate incentive payments for each possible outcome, of which there are two. Specifically:
  - The **PCD non-delivery** payment is applied to the total number of units that were not delivered within the AMP. In this example, the rate would apply to 10 units.
  - The **time incentive payment** is a payment made to customers based on the cumulative annual difference between outturn and target outcomes in each year of AMP8, to account for delays in delivery within AMP8, and thus the fact that customers receive the benefits later. In this example, the rate would apply each year to the bottom row of the table (e.g. 4 units in Year 3).
- Details regarding the full list of data inputs and formulae that we used to calculate the two payments are provided here.

Stylised example of our approach

| | |
|---|---|
| Years in AMP8 | 5 |
| Target units in AMP8 | 30 |
| P90 project overrun | 50% |
| Implied years to deliver total units | 5*(1+50%) = 7.5 |

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total over AMP8 |
|---|---|---|---|---|---|---|
| Delivery profile | 5% | 15% | 20% | 25% | 35% | 100% |
| Target | 1.5 | 4.5 | 6 | 7.5 | 10.5 | 30 |
| P90 outcome | 1 | 3 | 4 | 5 | 7 | 20 |
| **Units delivered late** | **0.5** | **1.5** | **2** | **2.5** | **3.5** | **10** |
| **Units delivered late (cumulative)** | **0.5** | **2** | **4** | **6.5** | **10** | **10** |

Units delivered 'late' in each year of AMP8

Units not delivered in AMP8

# OUR ANALYSIS ESTIMATES THAT THE RoRE AT RISK FOR AFFINITY AS A RESULT OF PCDS IS BETWEEN -1.68% AND -0.54% (BASED ON NOTIONAL GEARING).

- After summing the time incentive and non-delivery payments for each PCD under the 3 outcomes scenarios (P10, most likely, and P90), we are left with a RoRE range for each PCD expressed in £s.
- We then convert these values from being expressed in £s, to being expressed as a % of RoRE (using both the notional and actual gearing ratio), before then aggregating across PCDs, using a Monte Carlo approach. Further details about Monte Carlo models can be found in Annex F. This produces our 'actual' company-specific risk range for PCDs.
- To generate our 'notional' risk range for PCDs, we have modified the 'actual' company-specific risk (calculated using notional gearing). Specifically, we have downscaled the risk range based on the proportion of total enhancement spend that Ofwat expects to be included in PCDs over PR24.
- The table to below shows a summary of our results. This shows that:
  - We calculate 'actual' company-specific PCD risk to be between -1.68% (P10) and -0.54% (P90), based on notional gearing; and between -3.66% to -1.19% based on actual projected gearing.
  - We estimate 'notional' PCD risk is between -1.56% and -0.51%.

**Table: Summary of RoRE risk ranges**

| Risk analysis type | Gearing type | P10 | P90 |
|---|---|---|---|
| 'Actual' | Notional gearing (55%) | -1.68% | -0.54% |
| | Actual gearing (79%) | -3.66% | -1.19% |
| 'Notional' | Notional gearing (55%) | -1.56% | -0.51% |

*Source: Economic Insight analysis*

# CALCULATING PCD PAYMENTS

## INPUTS AND FORMULAE

# INPUTS: WE HAVE TAKEN DATA ON TIME-DEPENDENT PCD-RELATED INPUTS FROM INFORMATION PROVIDED TO US BY AFFINITY.

- The time-dependent PCD-related inputs to our analysis are set out in the following table for 4/5 PCDs. For "Resilience", the units for each scheme within a PCD are different, so we have shown the inputs for each PCD separately on the next slide.

**Table: Time-dependent PCD-related inputs**

| Metric | PCD | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | Total |
|---|---|---|---|---|---|---|---|
| PCD target | Supply Side Improvement and Internal Interconnectors - Connect 2050 (Ml/d) | 0.0 | 0.0 | 0.0 | 0.0 | 141.0 | 141.0 |
| | Smart metering (millions of meters) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 |
| | Raw Water Quality Deterioration (Ml/d) | 33.3 | 12.7 | 387.0 | 6.9 | 0.0 | 439.9 |
| | Sustainable reductions (Ml/d) | 0.0 | 0.0 | 0.0 | 0.0 | 34.5 | 34.5 |
| Capex (£m) | Supply Side Improvement and Internal Interconnectors - Connect 2050 | £0.0m | £0.0m | £0.0m | £0.0m | £89.0m | £89.0m |
| | Smart metering | £24.3m | £24.6m | £24.9m | £25.3m | £25.3m | £124.5m |
| | Raw Water Quality Deterioration | £28.8m | £32.0m | £19.8m | £9.0m | £0.0m | £89.7m |
| | Sustainable reductions (Ml/d) | £0.0m | £0.0m | £0.0m | £0.0m | £125.6m | £125.6m |

*Source: Affinity Water*

# INPUTS: WE HAVE TAKEN DATA ON TIME-DEPENDENT PCD-RELATED INPUTS FROM INFORMATION PROVIDED TO US BY AFFINITY.

- The profile of units delivered and capex is shown for each scheme within "Resilience" below.

**Table: Time-dependent PCD-related inputs (Resilience)**

| Metric | Scheme | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | Total |
|---|---|---|---|---|---|---|---|
| PCD target | Single Points of failure (100k properties protected) | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 |
| | Network calming (Ml/d) | 0.0 | 0.0 | 0.0 | 0.0 | 3.4 | 3.4 |
| | Floods alleviation (sites protected) | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 6.0 |
| Capex (£m) | Single Points of failure (100k properties protected) | £0.0m | £0.0m | £0.0m | £0.0m | £5.2m | £5.2m |
| | Network calming (Ml/d) | £0.0m | £0.0m | £0.0m | £0.0m | £8.9m | £8.9m |
| | Floods alleviation (sites protected) | £0.0m | £0.0m | £0.0m | £0.0m | £1.1m | £1.1m |

*Source: Affinity Water*

# INPUTS: DATA ON NON-TIME-DEPENDENT PCD-RELATED INPUTS IS ALSO TAKEN FROM INFORMATION PROVIDED TO US BY AFFINITY.

- Affinity has provided us with: (i) unit costs for each PCD; and (ii) risk scores for each of the schemes in a particular PCD.
- We aggregate the scheme risk profiles to the PCD level by taking a simple average of the risk ratings across the schemes corresponding to that PCD:
  - For three PCDs, the correlation is positive and strong between totex and the scheme risk profile – implying that higher totex schemes are ranked as riskier.
  - For the other two PCDs ("Smart metering" and "Resilience"), the correlation is either positive but small in magnitude, or slightly negative. Therefore, we also calculate a weighted average (using capex) and find that the aggregated score is unchanged using this approach.

**Table: Non-time-dependent PCD-related inputs provided by Affinity**

| PCD | Unit cost (£m per unit) | Risk profile |
|---|---|---|
| Supply Side Improvement and Internal Interconnectors - Connect 2050 | £0.6 | 3 |
| Smart metering | £330.1 | 3 |
| Raw Water Quality Deterioration | £0.2 | 3 |
| Sustainable reductions | £34.5 | 4 |

*Source: Affinity Water*

**Table: Non-time-dependent PCD-related inputs provided by Affinity (Resilience)**

| Scheme | Unit cost (£m per unit) | Risk profile |
|---|---|---|
| Single Points of failure | £4.5 | 1 |
| Network calming | £2.6 | 3 |
| Floods alleviation | £0.2 | 3 |

*Source: Affinity Water*

# INPUTS: DATA ON OTHER INPUTS IS TAKEN FROM INFORMATION PROVIDED TO US BY AFFINITY AS WELL AS OFWAT'S FINAL METHODOLOGY.

- We also use the following additional data in our modelling:
  - **Wholesale WACC**: 3.23% - this is sourced from Table 2.1 of Annex 11 of Ofwat's Final Methodology.
  - **RCV**: £2,185.0m – this is the average of Affinity's latest forecast over AMP8.
  - **Notional gearing**: 55.0% – this is taken from Table 2.1 of Annex 11 of Ofwat's Final Methodology.
  - **Actual gearing**: 79.4% – this is the average of Affinity's latest AMP8 forecast.
  - **Cost sharing rate**: 60% - this is taken from from Table 2.3 of Annex 9 of Ofwat's Final Methodology.
    - We have chosen this rate to reflect the "worst case scenario" for Affinity, in the case of: (i) overspend; and (ii) an "Inadequate" rating by Ofwat.
  - **Time rate**: 3.5% - this is taken from page 10 of Ofwat's document: "IN-2305-Further-guidance-on-price-control-deliverables-for-PR24".

# METHOD: WE HAVE BASED OUR CALCULATION OF THE TWO PCD PAYMENTS BASED ON OFWAT'S WORKED EXAMPLE (1).

- We calculate **PCD non-delivery payment** using the following 3 steps:
  - **Step 1**: we calculate the total non-discounted payment based on the overall divergence between outturn and target outcomes at AMP8.
    - $Non\ discounted\ PCD\ non-delivery\ payment = \sum_{n=1}^{5}(PCD\ outturn_n - PCD\ target_n) \times PCD\ rate$
    - For the years, n=1 corresponds to 2025-26, up to n=5 which is 2029-30 – this applies to the remainder of this slide, and the next.
    - The PCD rate is calculated as: $PCD\ rate = Unit\ cost * Cost\ sharing\ rate$
    - The PCD outturn is calculated based on the P10, P50 and P90 delivery rates shown in here for the risk profile of the PCD in question, applying the approach shown here.
  - **Step 2**: we calculate the discount payment:
    - $Discounted\ PCD\ non-delivery\ payment = \sum_{n=1}^{5}(Non\ discounted\ PCD\ non-delivery\ payment \times Share\ of\ PCD\ expenditure\ in\ year_n) \div (1+WACC)^n$
  - **Step 3**: we apply an inflator to: (i) Supply Side Improvement and Internal Interconnectors - Connect 2050; and (ii) Raw Water Quality Deterioration:
    - $Inflated\ discounted\ PCD\ non-delivery\ payment = Discounted\ PCD\ non-delivery\ payment \times (1+Inflator)$
- For "Resilience", we have undertaken the above approach on each of the three schemes separately, before then summing the separate non-delivery payments amounts. This is because the unit costs across schemes are not comparable since the schemes are all measured in different units.

# METHOD: WE HAVE BASED OUR CALCULATION OF THE TWO PCD PAYMENTS BASED ON OFWAT'S WORKED EXAMPLE (2).

- We have calculated the **time delay payment** in two steps:
  - **Step 1**: we have calculated the non-discounted payment in each year n based on the cumulative divergence between outturn and target outputs:
    - $Non\ discounted\ PCD\ time\ delay\ payment_n = \sum_{t=1}^{5}(PCD\ outturn_t - PCD\ target_t) \times Time\ rate$
    - The PCD outturn is calculated based on the P10, P50 and P90 delivery rates shown in here for the risk profile of the PCD in question, applying the approach shown on here.
  - **Step 2**: we have calculated the discounted payment:
    - $Discounted\ PCD\ time\ delay\ payment = \sum_{n=1}^{5} Non\ discounted\ PCD\ time\ delay\ payment_n \div (1 + WACC)^n$

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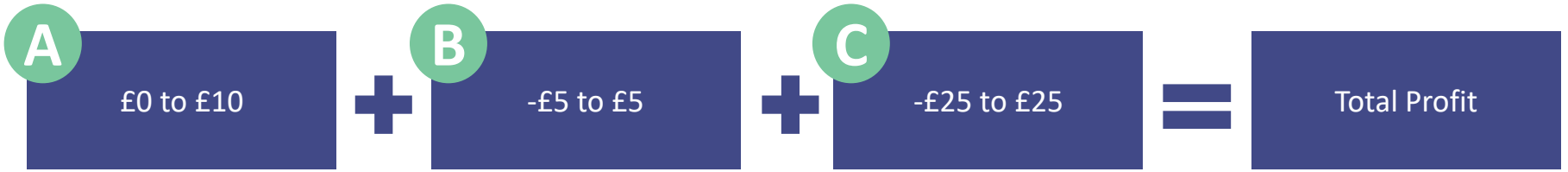
# ANNEX F: OUR USE OF MONTE CARLO MODELS

# INTRODUCTION: WE USE MONTE CARLO MODELS TO AGGREGATE RISK AREAS, WHICH PROVIDES A MORE INFORMATIVE VIEW OF RORE RISK COMPARED TO USING A SIMPLE AGGREGATION.

- In this annex, we set out why we use Monte Carlo Models to aggregate our results and explain how the models work.
- We use Monte Carlo Models on three occasions in our methodology:
  - To aggregate the risks of individual **ODIs and MeX** to produce a single risk range for this area;
  - To aggregate the risks of individual **PCDs** to produce a single risk range for this area; and
  - To aggregate the risks across **all risk areas** (totex, RFI, ODIs and MeX etc.), to produce an overall risk range.
- We do this both for our analysis of Affinity's actual company risk, and our analysis of the risk faced by the notionally efficient firm.
- There are two key reasons for using a Monte Carlo simulation to aggregate the results:
  - Firstly, this method reflects the fact that it is highly unlikely that a company will experience the extreme ends of all risks simultaneously – i.e. they are unlikely to perform at the P10 on each risk area at the same time. A Monte Carlo model therefore builds in a more realistic range of possibilities.
  - Secondly, the output of the Monte Carlo simulation is not simply a range of two numbers, but a distribution of possible values of an aggregated outcome. This allows us to gather more information about expected RoRE (e.g. most likely value, P10, P90), than we could gain from a simple aggregation approach.
- The following slides illustrate an example of precisely how our Monte Carlo Models works.

# MONTE CARLO EXAMPLE: THE RATIONALE FOR USING A MONTE CARLO MODEL

- As a simple example, consider a company, with total profit determined by three profit streams called A, B and C. Imagine we know (from past experience) that each profit stream will fall within a certain range, and that each of the possible levels of profit in that range is equally likely.




- Without using a Monte Carlo, we could determine the range that our total profit would fall into. In this example, the lowest possible profit would be -£30 and the highest possible profit would be £40. However, it is unlikely that this company performs at these extreme values, assuming there is not a high correlation between profit streams, so this simple aggregation is of limited use for assessing company risk.
- Instead, by using a Monte Carlo model, we can determine the distribution of total profit values that we could expect. This then allows us to gather more information and useful statistics about expected profits (e.g. most likely value of profit, P10, P90), which would not have been possible when using a simple aggregation.

# MONTE CARLO EXAMPLE: THE INPUTS REQUIRED BY THE MODEL.

- The Monte Carlo model requires three main inputs:
  - **The underlying distributions that determine the final output we are interested in**. In the example on the previous slide, these were the distributions of the company's three profit streams (A, B and C). In the example, the distribution of possible outcomes is uniform. In our final analysis the inputs have triangular distributions.
  - **The seed.** The Monte Carlo model relies on selecting random numbers from each of the underlying distributions. When using random numbers for analysis, it is best practice to set a "seed" for the random numbers. This ensures the outputs of the simulation will be replicable (but still random).
  - **The number of simulations.** The Monte Carlo model relies on using many simulations of numbers that the underlying distributions could produce. The more simulations that the Monte Carlo uses, the more accurate its final output will be; and thus less sensitive to the choice of seed.

| A | B | C |
|---|---|---|
| 0 | -5 | -25 |
| 1 | -4 | -20 |
| 2 | -3 | -15 |
| 3 | -2 | -10 |
| 4 | -1 | -5 |
| 5 | 0 | 0 |
| 6 | 1 | 5 |
| 7 | 2 | 10 |
| 8 | 3 | 15 |
| 9 | 4 | 20 |
| 10 | 5 | 25 |

| Inputs | |
|---|---|
| Seed | 123 |
| Simulations | 10,000 |

# MONTE CARLO EXAMPLE: HOW THE SIMULATION WORKS.

- The Monte Carlo model works by selecting random numbers from the underlying distributions over and over.
- Using our stylized example, in the first simulation (shown in green), the Monte Carlo model randomly selects £1 profit from A, -£2 profit from B and £25 profit from C. The outcome of that simulation is that the company earns a total profit of £24.
- This exercise is repeated for as many simulations as we tell the model to run. In this case, the model produces 10,000 simulations, i.e. 10,000 possible total profits that the company may earn.
- It is entirely possible that some simulations choose the same value of one of the inputs, e.g. Simulation 1 and 3 both randomly select a profit of -£2 for B.

| A | B | C |
|---|---|---|
| 0 | -5 | -25 |
| 1 | -4 | -20 |
| 2 | -3 | -15 |
| 3 | -2 | -10 |
| 4 | -1 | -5 |
| 5 | 0 | 0 |
| 6 | 1 | 5 |
| 7 | 2 | 10 |
| 8 | 3 | 15 |
| 9 | 4 | 20 |
| 10 | 5 | 25 |

Simulation 1 = [ ] + [ ] + [ ] = 24

Simulation 2 = [ ] + [ ] + [ ] = -20

Simulation 3 = [ ] + [ ] + [ ] = 7

...

...

...

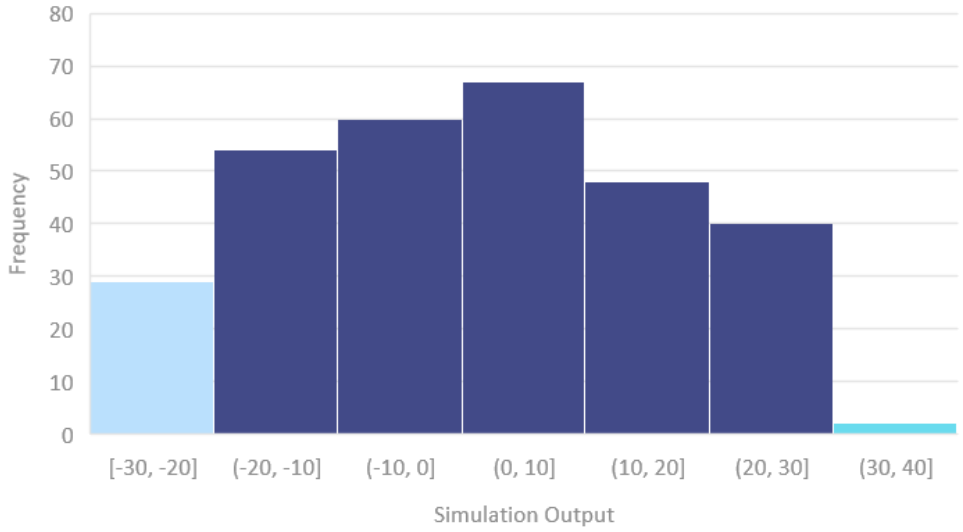
Simulation 10,000 = = -6

# MONTE CARLO EXAMPLE: THE OUTPUTS OF THE MODEL.

- Finally, we can take the output of these 10,000 simulations to get a distribution of possible outcomes. In our stylized example, this is the total profit of the company.
- We establish that the most likely outcome is that the company earns a profit of between £0 to £10. We also establish that, even though a profit of £40 was at the top of the range, it is much more likely that the company earns a profit at the bottom of the range (around -£30). Insights of this nature would not be possible without the Monte Carlo model.

| Simulation | Aggregated |
|---|---|
| 1 | 24 |
| 2 | -20 |
| 3 | 7 |
| . | . |
| . | . |
| . | . |
| 10,000 | -6 |

| Aggregated Outcome |
|---|
| -30 |
| -29 |
| -29 |
| . |
| . |
| . |
| 40 |



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